

Report No. FAA-RD-76-128 BOOK 2



MODEL USERS' MANUAL FOR AIRFIELD CAPACITY AND DELAY MODELS



Carl T. Ball



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November 1976 Final Report

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FEDERAL AVIATION ADMINISTRATION
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METRIC CONVERSION FACTORS

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PREFACE

The report contains examples for the Delay Simulation Model described in Chapter 4 of "Model Users' Manual for Airfield Capacity and Delay Models" FAA-RD-76-128 dated November 1976.



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ATTACHMENT A

The following examples illustrate the use of the Delay Simulation Model Version 2.

EXAMPLE 1.

A. OBJECTIVE

The airlines at the airport depicted by the link-node diagram in Figure 4-7 are considering purchasing equipment which is projected to reduce gate occupancy time by 30%. Determine the magnitude of the present gate delay and the expected gate delay if the new equipment is added.

B. INPUTS

INPUT CONSIDERATIONS:

- 1. Limit the analysis to VFR weather conditions.
- Limit the analysis to one runway use configuration; i.e.,

arrivals on runway 28L & R departures on runway 28L no touch-and-go operations

- 3. Limit the analysis to the hours from 1:00 p.m. to 6:00 p.m. on the average day of the peak month.
- 4. Use air traffic control procedures effective July 4, 1976.
- 5. Do not allow departure aircraft to hold at a gate longer than is required to service the aircraft.

FIELD DATA:

Data collected at the airport reveals the following:

Parameter	Heavy Jets	Large Jets
Departure Runway Occupancy	ow katero orani missa	
Time (mean/standard deviation		
in seconds)	39/5	39/5
Approach Velocity (mean/standard		
deviation in knots)	140/5	130/5
Approach Path (n.mi.)	8	8
Gate Occupancy Time (mean/standard		
deviation in minutes)	50/10	30/5

Taxi Speed (mph)	Link(s)	
5	106-115	
10	132-135, 125-127	1
10	116-117, 104-105	
15	118-124, 103	
20	102, 131	
25	128-130, 101	

Pushback Time (s	econds) Link(s)
66	1-10
6	21-30

Aircraft Type	Exit Distance (feet)	Arrival Runway Occupancy Time (seconds)	Exit% (Right Angle Exit)	Exit% (High-speed Exit)
1	6000	56	40	100
2	6000	56	70	100
1	8000	73	100	100
2	8000	73	100	100

A penalty box that can accommodate 10 aircraft is located on the west end of the terminal building.

The exclusive use gate sets exist:

Airline	Gates
AA	1-5
TWA	6-8
UA	9-10

All gates are large enough to accommodate heavy jet aircraft.

INPUT ASSUMPTIONS:

- 1. Insufficient data is available to determine the actual separation between aircraft. Assume that the average separations are those specified in the air traffic control handbook for heavy and large aircraft. Use standard deviations of:
 - 0.5 nautical miles for arrival-arrival separations
 - 0.25 nautical miles for departure-arrival separations
 - 0.25 minutes for departure-departure separations
- 2. Assume preemptive arrival priority can be obtained by requiring a queue of eight departures before the arrival stream is interrupted. When this condition exists insert a 2.0 minute gap in the arrival stream.
- Use 10 random number seeds to obtain stocastic convergence.

GEOMETRY DATA:

- 1. Runway length = 8000 feet
- 2. Exits 128 and 101 are located 6000 feet from threshold.

3.	Link(s)	Length (feet)
	102-126	300
	130,134,135	400
	101	500
	128, 129	900
	131	1900

NOTE:

- o Links 128 and 129 were made 900 feet long because only two aircraft can hold between the runways.
- o Link 131 was made 1900 feet long to allow the program to operate more efficient in moving aircraft since few aircraft use this section of taxiway.
- o All other links are used at their actual length.
- 4. Paths are required:

From	To			
Link 128	all	holdi	ng areas &	gates
Link 129	**	**	**	
Link 101	11	11		11
Each holding				
area	to	all ga	tes	
Each gate	Lin	k 126	(departure	end link)

- 5. There are no one-way paths on the airport.
- The decision to cross runway 28L is made on links
 132 and 133.

SCHEDULE DATA:

1. The schedule data for the hours from 1:00 p.m. to 6:00 p.m. is shown in Figure 4-8. This data includes:

Airline ID
Preferred Gate
Aircraft Class
Arrival Time at Threshold
Departure Time from Gate
Arrival Runway
Departure Runway

2. All aircraft are through flights.

NOTE: The departure time in Figure 4-8 is shown as 1 minute after arrival time at threshold so that the aircraft service time (as opposed to the scheduled departure time) will always govern when the departure leaves the gate.

C. SOLUTION

A listing of the input cards for this example is shown in Figure 4-9. The model runs for this example are shown in Figures 4-10a and 4-10b. From the output of the model runs, the following comparison of gate delay with and without the new equipment can be made:

	PRE	SENT	WITH	NEW
HOUR	SITU	ATION	EQUI	PMENT
	Gate-in	Gate-out	Gate-in	Gate-out
1-2	2.95	0.05	0.56	0.05
2-3	9.63	0.06	1.83	0.05
3-4	10.49	0.07	2.16	0.04
4-5	16.41	0.08	2.73	0.05
5-6	13.31	0.04	1.64	0.03
Average				

Total arrival gate delay can be calculated as follows:

With New Equipment

0.56 x 13 = 7.28 1.83 x 12 = 21.96 2.16 x 10 = 21.60 2.73 x 12 = 32.76 1.64 x 13 = $\frac{21.32}{104.92}$

Present Situation

2.95 x 13 = 38.35 minutes 9.63 x 11 = 105.93 10.49 x 10 = 104.90 16.41 x 11 = 180.51 13.31 x 12 = 159.72 589.41

The new equipment will reduce gate-in delay by 484.49/589.41 = 83%. The computer time to make these runs cost \$63.

EXAMPLE 2.

A. OBJECTIVE

Determine the average arrival and departure runway delay between 2:00 p.m. and 4:00 p.m. for the airfield shown by the link-node diagram in Figure 4-11.

B. INPUTS

INPUT CONSIDERATIONS:

- 1. Consider VFR weather conditions.
- 2. Consider the following runway use configurations:

arrivals on runways 32L & 27R departures on runways 27L & 32R

3. Use the air traffic control rules effective November 2, 1975.

FIELD DATA:

Data collected during a 2-week period at this airport was used to determine the following parameters:

- o Departure runway occupancy time
- o Touch-and-go runway occupancy time
- o Gate service time
- o Aircraft approach velocity
- o Length of common approach path
- o Exit utilization percent
- o Arrival time-distance histogram
- o Arrival-arrival separations
- o Departure-arrival separations
- o Departure-departure separations
- o Arrival-departure separations

Input values for these parameters are shown in Figure 4-12.

- 4. Airline gate assignments are shown on Figure 4-12. During data collection, it was determined that airline UA did not normally permit large jets to use gates reserved for heavy jets. Therefore, the gates for heavy jets were assigned to airline UA2 and gates for large jets were assigned to airline UA1.
- 5. A penalty box that can accommodate five aircraft is located off runway 32L.

INPUT ASSUMPTIONS:

1. Assume preemptive arrival priority can be obtained by requiring a queue of eight departures before the arrival stream is

interrupted. When this condition exits, insert a 2-minute gap in the arrival stream.

2. Use 10 random number seeds to obtain stocastic convergence.

GEOMETRIC DATA:

- 1. Link data is shown in Figure 4-12. The figure contains:
 - o Link length
 - o Gate pushback time
 - o Gate size
 - o Pushback one-way path associated with some gates
 - o Aircraft velocity code for each link
 - 1 5 miles per hour
 2 10 " " "
 3 15 " " "
 4 23 " " "
 5 25 " " "
 6 35 " " "
 7 Special code for pushback time
- Because of the traffic flow pattern for the runways, no crossing links are required.
 - 3. Exit Locations

Exit Link	Distance(feet)
406	4460
401	5480
391	6800
538	4330
519	5480
530	6080

- 4. Paths are required to move aircraft between:
 - 6 exits and 92 gates
 - 6 exits and 5 holding areas
 - 5 holding areas and 92 gates
 - 92 gates and 2 departure runways

The paths are contained in Figure 4-12.

5. Nineteen one-way paths are required by the flow of aircraft on airfield. Seventeen of these one-way paths represent taxiways serving pier-finger gate arrangements. The remaining two one-way paths (i.e., links 288 and 289) serve as the transition taxiway between the outer and inner taxiway. It has to be entered in both directions; i.e., 288 289 and 289 288.

SCHEDULE DATA:

The schedule data for the hours from 10:00 p.m. to 6:00 p.m. is shown in Figure 4-12. This data includes:

Airline ID
Preferred Gate
Flight Type
Aircraft Class
Arrival Time at Threshold
Departure Time from Gate
Arrival Runway
Departure Runway

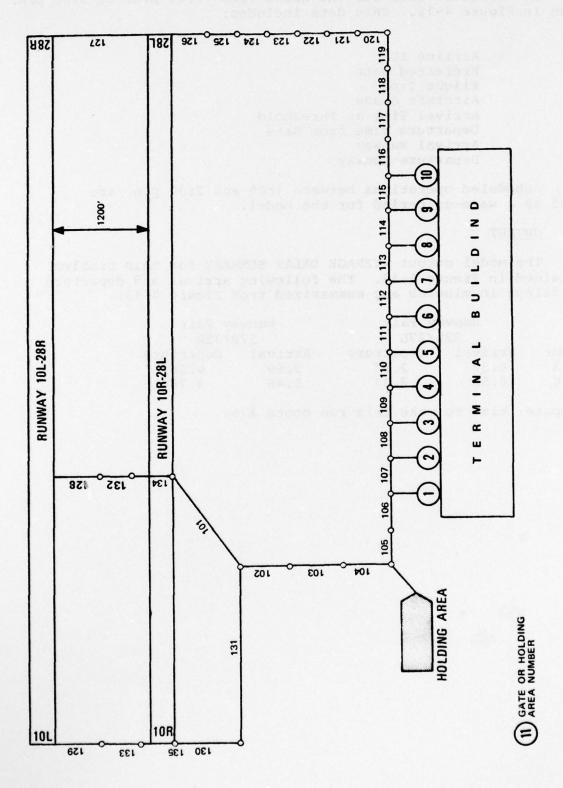
Scheduled operations between 1:00 and 2:00 p.m. are included as a warm-up period for the model.

C. OUTPUT

The model output AVERAGE DELAY SUMMARY for this problem is contained in Figure 4-13. The following arrival and departure runway delays in minutes are summarized from Figure 4-13:

	Runwa	ay Pair	Runway Pair			
	32:	L/27L	27R/32R			
Hour	Arrival	Departure	Arrival	Departure		
2-3	0.52	2.67	2.69	4.56		
3-4	0.58	2.01	0.46	1.78		

The computer time to make this run costs \$76.



LINK-NODE DIAGRAM FOR EXAMPLE 1 Figure 4-7

Airline ID	Preferred Gate	Aircraft Class	Arrival Time	Departure Time	Arrival Runway	Departure Runway
		0		4 19 19	100	
AA	3 2 8	2	1:00	1:01	2	2 2 2 2 2
AA .	2	1	1:02	1:03	1	2
TWA		2	1:03	1:04	1	2
UA	9	2	1:03	1:04	2	2
AA	3	2	1:14	1:15	2	2
UA	10	2	1:15	1:16	1	2
AA	3	2	1:16	1:17	2	2
AA	3 2 8	1	1:30	1:31	1	2 2
TWA		2	1:31	1:32	1	2
UA	9	2	1:31	1:32	2	2
TWA	6	1	1:32	1:33	2	2
AA	4	2	1:45	1:46	1	2
AA	5	2	1:45	1:46	2	2
UA	10	2	2:00	2:01	1	2
AA	2	1	2:03	2:04	1	2
TWA	7	2	2:03	2:04	2	2
AA	5	2	2:14	2:15	2	2
TWA	5	1	2:16	2:17	2	2
AA	3	2	2:17	2:18	2	2
AA	4	2	2:30	2:31	1	2
AA	2	ī	2:31	2:32	i	2
TWA	7	2	2:31	2:32	2	2
UA	10	2	2:33	2:34	ī	2
AA	5	2	2:46	2:47	2	2
AA	ź	ī	2:47	2:48	ī	2
AA	1	2	2:52	2:53	2	2
AA	1	2	3:00	3:01	1	2
AA	5	2	3:03	3:04	2	2
TWA	ŕ	2 2	3:14	3:15	2	2
AA	2	ī	3:15	3:16	ī	2
AA	1	2	3:16	3:17	i	2
TWA	8	2	3:16	3:17	i	2
UA	9	2	3:16	3:17	2	2
UA	10	2	3:45	3:46	1	2
TWA	6 .	ī	3:45	3:46	2	2
AA	1	2	3:52	3:53	2	2
AA	3	2	3:55	3:56	1	2
AA		2	4:00	4:01		
AA	. 2 8	1	4:02	4:03	2	2
TWA	8	2	4:03	4:04	i	2
UA	9	2	4:03	4:04	1 2 2 1	2
AA	3	2	4:14	4:15	2	2
UA	10	2	4:15	4:16	1	2
AA	9 3 10 3 2 8 6	2	4:16	4:17	2	2
AA	2	1	4:30	4:31	1	2
TWA	8	2	4:31	4:32	i	2
TWA	6	1	4:32	4:33	2	2
AA	4	2	4:45	4:46	1 2 1 2	2
AA	5	2	4:45	4:46	2	2
UA	10	2	5:00	5:01	ī	2
AA	2	1	5:03	5:04	1	2
TWA	5 10 2 7	2	5:03	5:04	2	2
AA	5	1 2 2 2 2 2 1 2 1 2 2 2 2 2 2 2 2 2 2 2	5:14	5:15	1 2 2	3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
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SCHEDULE DATA FOR EXAMPLE 1 FIGURE 4-8

Airline ID	Preferred Gate	Aircraft Class	Arrival Time	Departure Time	Arrival Runway	Departure Runway
TWA	6	1	5:16	5:17	2	2
AA	3	2	5:17	5:18	2	2
AA	4	2	5:30	5:31	ī	2
AA	2	1	5:31	5:32	î	2
TWA	7	2	5:31	5:32	2	2
UA	9	2	5:32	5:33	2	2 2 2
UA	10	2	5:33	5:34	ī	2
AA	5	2	5:46	5:47	2	2
AA	2	1	5:47	5:48	ī	2
AA	1	2	5:52	5:53	2	2
AA	1	2	6:00	6:01	1	2
UA	9	2	6:00	6:01	2	2
AA	5	2	6:03	6:04	2	2
TWA	7	2	6:14	6:15	2	2
AA	2	1	6:15	6:16	1	2
AA	1	2	6:16	6:17	i	2
AWT	8	2	6:16	6:17	ī	2
UA	9	2	6:16	6:17	2	2
UA	10	2	6:45	6:46	1	2
AWT	6	1	6:45	6:46	2	2
AA	1	2	6:52	6:53	2	2
AA	-3	2 ,	6:55	6:56	ī	2

FIGURE 4-8 (Cont.)

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//FAAPRGT1 JOB (L.1353706,T0891). C. BALL-FAA., // LIM=(2.5.10.20).REGION=490K
//*DSS FAAHYDSS
// EXEC FORTGO
//STEPLIB DO DISP=(OLD.KEEP).UNIT=3330-1.
// DSN=SYS3.FAA.DELAY.VER1.VOL=SER=CSLB40
//GO.FTO6FOUL DO SYSOUT=A
//GO.FTU9FOOL DD UNIT=SYSDA, SPACE=(TRK, (5.5))
//GU.FTU8F001 DD #
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LISTING OF INPUT CARDS FOR EXAMPLE 1 FIGURE 4-9

AA	3	3	4	4:14	4:15	2	2
UA	10	3	2	4:15	4:10	1	5
AA	10 3	3	2	4:16	4:1/	2	5
AA	2	3	i	4:30	4:31	1	2
TWA	8	3	4	4:31	4:32	1	2
TWA	6	3	i	4:32	4:33	2	2
AA		3	2	4:45	4:40	1	5
AA	5	3	2	4:45	4:40	2	5
UA	10	3		5:00	5:01	1	2
AA	10	3	i	5:03	5:04	1	5
TWA	7	د.	2	5:03	5:04	2	5
AA	5	3		5:14	5:15	2	5
TWA	6	3	i	5:16	5:11	2	5
AA	3	3	2 2 2	5:17	5:18	2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
AA	4	3	2	5:30	5:31	1	2
AA	5	3		5:31	5:32	1	5
TWA	7	3	2	5:31	5:34	2	5
UA	9	. 3	5	5:32	5:33	5	2
UA	10	3	4	5:33	5:34	1	2
AA	5	3	2	5:46	5:41	2	S
AA	5	3	1	5:47	5:48	1	2
AA	ì			5:52	5:53	2	2
AA	1	3 3 3	R. R. R.	6:00	6:01	1	2
UA	9	3	2	0:00	6:01	2	2
AA	5	3	2	6:03	6:04	2	2
TWA	7	3	2	6:14	6:15	2	2
AA	2	3	ì	6:15	6:10	1	2
AA	1	3	2	6:16	6:17	1	2
TWA	8	3	4	6:16	6:11	1	2
UA	9	3	4	6:16	6:11	2	2
UA	10	3	4	6:45	6:40	1	2
TWA	6	3	1	6:45	6:46	2	2222222222222222
AA	1	3	2	6:52	6:53	2	2
AA	-3	ġ	5	6155	6:56	1	2

FIGURE 4-9 (Cont.)

2000 FALSE 2009 FALSE 2008 FALSE 2007 FALSE 2006 FALSE 5002 STU 10.0 5.0 TRUE STU-5.0 5.0 510 2.0 5004 GAP 2.0 FALSE 2003 RWY INTERARRIVAL GAP QUEUE LENGTH 8 RWY DEP. UCCUPANCY TIMES CLASS 1 MEAN 39.0 -2 39.0 RWY 1/60 UCCUPANCY TIMES MEAN 50.0 FALSE 25.0 MEAN 25.0 MANUOM NUMBER SEEUS 10 TIMES (STANT OF INISH) AZC SERVICE TIMES 00:9 -2 133 //GU.SYSIN DU * RUNMAY # LINK # RWY XING LINKS PRINT OPTIONS FALSE RWY END LINKS EXAMPLE 1 Rays NO. UF RWY NAMES 00:1 CLASS 1 -2 CLASS 1 FALSE

FIGURE 4-9 (Cont.)

																		5000.			5000.	
																ME)		34.	82.		38.	20
IL MILES															•	RWY ARRIVAL OCCUPANCY TIMES (DISTANCE OF EIAT TAXIWAY, TIME)		.000+	.0006		*000+	0000
NAUTICA														,	0009 10	DF EIAT I		29.	73.		29.	7.3
RWY LENGTHS OF COMMON APPROACH PAINS IN NAULICAL MILES RWY 1 CLASS 1 8.0						0.		٠.							.01	ISTANCE (3000	80000		3000.	0000
APPROACT	8.0	9.0	8.0		~	159	~	129	-		-				129 800	TIMES (C			65.		۲1.	111
F COMMON	2	1	2	CTION	1	4.	-		2	1.0	2	1.0	ANCES		.00	CCUPANCY	6	2000	7000.	0	2000.	2000
CLAS		~	~	RWY EXIT SELECTION		•	~	•			•		RWY EXIT DISTANCES	-	9 60	IVAL O		14.	56.	-	14.	24
Y LENG		, ,	7-	Y EXII		128		128		101	-5	101	Y EXIT	.,	126	Y ARRI		10001	.0009	7	1000.	00
3 3				3									3			Z.		10	9		10	"

47.

FIGURE 4-9 (Cont.)

	62 88 72					,													MEAN SID		55	3.	35	625	ż25	225	4. .25	۲۰ ۰۶۶	2.0 .25	1.45 .15	1.65 .15	ě.	5.	145	225	·.	4.	145	37
	07		30.																>	-		4	-	-	(→		, -	-	1			٧.	· V	·V	٧.		٠	Ţ	1-
	52		Ď,						S									OPER	CLASS	7	2	-	~	7	~	-	~	-	~	-	~	-	2	-	~	~	-	-	•
	*2	SPEEUS)	75.						4						510 5.0	5.0		SECUND OPERATION	טר כר	4	A	1	4	4	4	4	1	2	2	2	2	1	4	2	2	1	4	2	
	53	STAND	5. 20.					GATES	٦		10			SPEEDS (KNOTS)				IION	Y		6 0 0 0 0	-	-	-	_	•	-	-	1	1	-	-	1	-	-	~		~	, '
MEAS	22	SPEEDS (SIX	io. 1	NAMES	AIHLINES	TWA UA	GATES	S			1	2-	10				SEPARATIONS	FIRST OPERATION	CLASS	-		~	N	-		2	2	-	1	2	~	-	. 1						•
HOLUING AMEAS	212	TAXIWAY SH		LINE	3 (_	HL INE		1	Twa	•	NA U	•	A/C APPROACH	CLASS 1	-5	A/C SEPAR	,	40	4	A	٩	٩	0	0	0	0	0	9	0	9	•	4		0 =	٥			,

FIGURE 4-9 (Cont.)

********	.w e					
TAXIWAY LIN	SIZE LENGT	115PD) 5P	EED CODE	1-4AY	ROUTE	NU.
1	1 1.1		7	• "		
2	i i.		1			
3	i i.		,			
4	i i.		1			
5	1 1.		1			
6	1 1.		1			
1	1 1.1	U	7			
8	1 1.	10	1			
9	1 1.		7			
10	1 1.		1			
21	-	10	!			
25		10	,			
53		10				
24		0	,			
25		[U	,			
26		10	,			
21		U	,			
29		0	,			
30		Ü	į,			
101	500		5			
102	300		4			
103	300		3			
104	300		2			
105	300).	2			
106	30) •	1			
107	300		1			
108	300		1			
109	30		1			
110	300		1			
111	300		1			
112	30		:			
113 114	30 30					
115	30		i i			
116	30		ž			
117	30		2			
118	30					
119	30).	3			
119 120	30).	3			
121	30).	. 3			
122 123	30)•	3			
123	30).	3			
124 125 126 128	30		3			
125	30		2			
126	30	0.	2			
128	90	0 •	3			
129 130	40		3			
130	190		4			
131 132	30	0.	3 3 3 3 3 3 4 2 5 5 5			
133	30	0.	2			
134	40		2			
135	40	0.	-2			

TAXIMAY MUUTE	ıTES								
¦ ~	106	101	100	601	110	111	112	113	114
c11	116	117	110	611	120	151	122	123	124
125 12	156								
. ~	101	100	103	110	111	112	113	114	115
110	117	119	119	120	121	122	123	124	125
126									
20									
3	108	109	110	111	114	113	114	115	116
117	118	119	120	121	122	143	124	165	126
19									
4	109	110	111	112	113	114	115	116	117
118	119	120	121	122	123	124	125	120	
19									
'n	110	111	114	113	114	115	116	117	118
119	140	121	122	123	124	125	126		
17									
•	111	112	113	114	115	911	117	110	119
120	121	155	123	124	155	156			
97									
7	115	113	114	115	116	117	118	119	120
171	122	123	124	125	126				
15									
20	113	114	115	116	1117	118	611	140	121
122	123	124	125	126				202	
14									
6	114	115	110	117	118	119	120	151	122
123	124	125	120						
7		***			9		:		
10	115	110	117	118	119	150	171	166	123
154	165	126							

FIGURE 4-9 (Cont.)

			4	110	110	110	110	110	110
		m	109	109	109	601	109	601	109
	8	108	108	109	103	108	108	108	108
1.00	101	101	107	107	101	101	101	101	101
100	100	106	100	100	106	100	100	100	106
105	105	501	105	105	105	501	105	501	105
104	104	104	104	104	104	104	104	104	100
103	103	103	103	103	103	103	103	103	103
102	102	102	705	102	102	102	102	102	102
101	101	101	101	101	2011	101	1011	1101	111

FIGURE 4-9 (Cont.)

FIGURE 4-9 (Cont.)

	21	22	23	54	55	92	27	28	58	30		4-9 (Cont.)	
	104	104	104	104	104	104	104	104	104	104		FIGURE	
	103	103	103	103	103	103	103	103	103	103			
	102	705	102	707	705	102	102	102	102	102			
0	101	101	101	101	101	101	101	101	101	101			

107		107		101			107			107			107			107			107			107			-
1.06	0	106	:	106			106	•		106			100			100	•		100			100		707	2
105	115	105	•	105			105			105			105			105			105			105		301	001
104	114	104	114	104	- 3 0		104			104			104	•		104	ı		104			104		104	101
103	ii.	103	113	103	113	•	103	1		103			103			103			103			103		104	501
102	112	102	112	102	112		102	112		102	9		102			102			102			105		102	101
101	111	101	ııi	101	Ξ		101	111		101	111		101	·s		101			101			101		101	•
134	110	134	110	134	110		134	110		134	110		134	110		134	4		134			134		134	:
132	601	132	109	132	109		132	105		132	109		132	601		132	109		132	e		132		132	
128	108	128	108	128	108	16	128	108	15	128	108	14	128	108	13	128	108	12	128	108	-	128	~ :	128	

FIGURE 4-9 (Cont.)

77	22	23	24	57	56	12	28	67	30
104	104	104	104	104	104	104	104	104	104
103	103	103	103	103	103	103	103	103	103
105	102	102	102	102	102	102	705	102	102
101	101	101	101	101	101	101	101	101	101
134	134	134	134	134	134	134	134	134	134
132	132	132	132	132	132	132	132	132	132
128	126	128	126	128	128	128	126	128	128

x

FIGURE 4-9 (Cont.)

106	106	106	106	106	106	106	106	106	106
1100	0.00	cōl	101	çōl	105	Sõl	ŞÕI	105	5ō1
104	104	104	104	104	104	104	104	104	104
103	103	103 113	103	103	103	103	103	103	103
104	100	104	104	10 k	105	10¢	10¢	105	105
131	131	131	131	131	131	131	131	131	131
130	130	130	130	130	130	130	130	130	130
135	135 109	135	135	135	135	135	135 3	135	135
133 108	133 108	133	133 108	133	133 108	133	133	133	133
20 129 107	129	129 107	129	129	129	129 107	129	129	11 129 1

FIGURE 4-9 (Cont.)

7.	25	83	*	52.	97.	7	82.	5	20
104	104	104	104	104	104	104	104	104	104
103	103	103	103	103	103	103	103	103	103
10¢	100	10¢	105	10¢	105	105	104	10¢	102
131	131	131	131	131	131	131	131	131	131
130	130	130	130	130	130	130	130	130	130
135	135	135	135	135	135	135	135	135	135
133	133	133	133	133	133	133	133	133	133
129	129	129	129	129	129	129	129	129	129

FIGURE 4-9 (Cont.)

106 1
101

FIGURE 4-9 (Cont.)

														c		114			114	
												1		113		113			777	
										•		112		715		112			112	
								ß		111		111		111		111			111	
						*		110		110		110		110		110			110	
				•		109		109		109		109		109		109			109	
		v		100		100		108		108		109		108		100			108	
-		101		101		101		101		101		107		101		107			101	
106		105		106		901		106		106		105		104		105			106	10
22	*	22	2	25	9	22	1	25	20	25	•	22	10	22	11	22	5	12	25	115

FIGURE 4-9 (Cont.)

						1	113	113	113
					٥	114	115	711	112
				5	111	1111	111	H	=
			•	110	011	110	110	011	071
		7.	109	107	109	109	109	109	10%
	2	108	108	108	108	108	108	108	108
-	101	10/	101	101	101	101	107	101	107
106	106	106	106	100	106	100	106	106	106
105	501	501	501	105	105	105	105	501	105
23	η ₍₁₎ φ	23	23	23	53	23		12 23 114	13 114

FIGURE 4-9 (Cont.)

							113		113	113
					•	211	211		211	115
				S	1111	111	111		111	Ti.
			•	110	011	110	110		110	oit
		•	107	109	107	107	109		165	109
	~	108	100	108	P01	R01	901		108	108
-	101	10/	101	101	10/	1.01	101		197	101
106	100	100	106	106	100	100	106		106	100
105	105	105	105	501	105	.01	501		507	105
4 2	40	*~	* *	43	24.	5.5	**	12	114	24

FIGURE 4-9 (Cont.)

N		108	108	108 109 110	108 109 110 111	108 109 110 111 11c	71 111 011 601 801		10/ 108 109 110 111 112 113	108 109 110 111 115	
			*	110	110	110	110		110	110	
		ŋ.	104	102	107	102	109		104	109	
	N	108	901	108	106	108	108		108	108	
	107	101	10/	101	10/	101	10/		107	101	
	106	106	100	106	106	106	106		106	100	10
	501	105	105	105	105	105	105		501	105	115
3 0	59	25	25 8	50.00	501	ន្ធ	S &	15	25	52	114

FIGURE 4-9 (Cont.)

97	501	100	•						
50.	105	106	107	N					
9 9 1	501	106	101	100	יור				
- 92	105	100	101	104	109	4			
0 00	501	106	101	100	102	011	'n		
200	105	100	101	108	10%	011	111	•	
2 % :	501	100	107	108	107	011	111	112	1
9 0	501	901	101	807	109	110	1111	112	113
26	105	100	101	108	109	ořt	111	112	113
26	105	100	10/	108	103	ořt	ııı	112	113

FIGURE 4-9 (Cont.)

						1	113	113	113
					•	112	116	112	115
				n	111	111	111	111	111
			•	011	011	nin	011	110	011
		7	109	10%	109	10%	109	102	103
	N	108	109	108	108	901	108	106	100
-	107	107	107	107	101	107	101	107	107
106	901	106	106	106	106	106	106	106	106
501	105	105	501	105	105	105	105	105	105
12	624	27	- 20	520	62	25	17 8	12 21 114	13 27 114

FIGURE 4-9 (Cont.)

105	106	-						
105	106	101	2					
105	106	101	108	7) (
105	106	101	108	109	4			
105	106	101	108	109	110	'n		
105	106	101	108	109	011	111	o	
105	106	101	108	109	110	111	112	
501	106	101	901	109	071	111	211	
105	106	101	106	109	110	п	112	113
105	106	101	108	109	110	111	115	=

FIGURE 4-9 (Cont.)

62	501	106	-						
2 4	105	100	101	~					
25.	105	100	101	108	701				
- 63	105	106	101	108	109	◆,			
200	105	106	101	108	109	011	S		
62.	105	106	101	108	109	011	111	•	
33	501	106	107	801	105	110		112	7
15 B	105	106	107	108	109	011	Ξ	zit	113
27 51 1	105	106	107	108	109	071	I	115	113
13	105	106	10/	108	601	011	tri	112	113

FIGURE 4-9 (Cont.)

30		100	1						
υč	501	401	101	•					
2		201		•					
30		106	101	108	7				
,									
30		106	101	108	109	4			
•									
30		106	101	801	109	110	111	9	
10									
30		106	101	108	109	110	111	112	1
11									
30		901	101	108	109	110	111	112	113
80									
12									
30	105	106	107	108	109	110	111	112	113
114	•								
-13									
30	105	901	101	108	109	110	111	112	113
114	115	0.7							
COMPUTE									
S10P									
*/									

FIGURE 4-9 (Cont.)

AIRPORT DELAY SIMULATION MODEL--VERSION IID

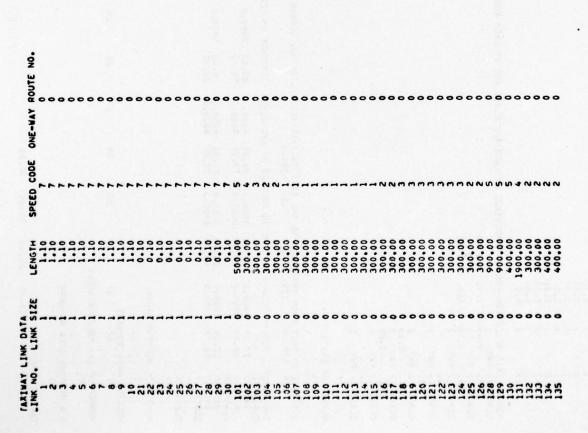
ATAOTUGNI

	5000				3	9.0		
	5006				STD. DEV	STD. DEV.		
	5008	Œ			A/C DEPARTURE RUNWAY OCCUPANCY TIME IN SECONDS (A/C CLASS. MEAN. AND STD. DEV.) 1 39.00 5.00 3 0.0 0.0 4 0.0 0.0	OCCUPANCY TIME IN SECONDS (A/C CLASS, MEAN, AND STD. DEV.) 2.00 0.0 0.0		
	2007	•			C CLASS.	C CLASS.	0. DEV.)	. DEV.)
	5006	•		THEN	CONDS (A.	ONDS (A/C	IN MINUTES (A/C CLASS. MEAN. STD. DEV.) 10.00 5.00. 0.0	IN KNOTS (A/C CLASS. MEAN. STD. DEV.) 5.00 5.00 0.0
	2005	•		NUMBERS AND THE LINKS WHICH CROSS THEM 2 132 2 133 RE QUEUE LENGTH AND INTERARRIVAL GAP 8 2.00	IME IN SE	4E IN SEC	c CLASS.	CLASS. H
SEEDS	2004 ME	•	. 59	INKS WHICH	UPANCY T	PANCY TIN	UTES (A/	07S (A/C
NUMBER	ER SEEDS 2002 2003 AND FINISH TIME 6: 0	. v	NUMBERS	NO THE L	S S S S S S S S S S S S S S S S S S S			
EXAMPLE 1 NUMBER OF RANDOM NUMBER SEEDS 10		F FUNWAYS	RUNNAY NAMES 28R 28L 34UNWAY END LINK NUMBERS 0 126	NUMBERS AN 132 2 133 2 133 RE QUEUE L	1 39.00 39.00 3 9.00 3 0.0	TOUCH-AND-GO RUNWAY 25.00 2 25.00 3 0.0 4 0.0	SERVICE TIME 1 50.00 2 30.00 4 0.0	A/C APROACH SPEED 1 140.00 2 130.00
EXAL NUMBER	START TIME	PRINT OPTIONS F VUMBER OF RUN	RUNMAY NAMES 288 3UNMAY END L	RUNWAY NUM 2 2 2 2 0EPARTURE 8	A/C DEP	TOUCH-41	GATE SER	A/C APP

MODEL RUN FOR EXAMPLE 1 - PRESENT CONDITIONS FIGURE 4-10a

LENGTHS OF COMMON APPROACH PATHS FROM OUTER MARKER TO THRESHOLD IN NAUTICAL MILES (RUNWAY NO.. A/C CLASS. LENGTH)

1 2 8.00
1 3 0.0
2 2 8 8.00
2 2 8 8.00
2 3 0.0
2 4 0.0 RUNMAY EXIT SELECTION--USAGE PERCENTAGE BY EACH A/C CLASS AND BY EACH RUNWAY (EXIT LINK NO. VERSUS PROBABILITY) CLASS 1 RWY 1 128. 0.40 129. 1.00 FIGURE 4-10a (Cont.) DISTANCE IN FEET FROM THRESHOLD TO THE EXIT TAXIMAY (EXIT LINK NO. VERSUS DISTANCE)
128 6000.0 129 8000.0 101 6000.0 ñ 8 28 27 30.00 56 25.00 52 20.00 5 NUMBER OF G/A HOLDING AREAS TAXIING SPEEDS IN MPH 5.00 10.00 15.00 6/A HOLDING AREA NUMBERS NUMBER OF HOLDING AREAS HOLDING AREA NUMBERS CLASS 4 RWY 2 128. 0.40 CLASS 2 RWY 1 CLASS 3 RWY 1 CLASS 4 RWY 1 CLASS 1 RWY 2 101: 1.00 CLASS 2 RWY 2 101: 1.00 CLASS 3 RWY 2 NUMBER OF EXITS CLASS 4



-	23	**	49	83	101	118	134	149	163	176	183	191	200	210	221	233	546	260	275	162	596	301	306	311	316	321	326
124 125 126	LOCATION 125 126	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION	LOCATION
1 122 123	2 123 124	3 1 26 1 26	201 421 6	2 126		,																					
20 12	21 12	22 22	21 22	24 12	26 12	:	971													0							
19 1	20 1			, ,	2 4			56										•		15							
117 118 119 12	21 118 119 120 1	20 120 121 1	119 160 161 1	18 12 12 12 12 12 12 12 12 12 12 12 12 12	17	166 163 164 1	163 164 163	124 125 126	125 126	126		•	10	n	12	13	14.	8 213	113 114	5 113 114 115	ıs	5	v	s	s	ıs	S
116			16 117 116 119 120 121 122 123 124 125 126 125 126 126 126 127 127 127 127 127 127 127 127 127 127		2 .		162 163 164 165	123 124 125	124 125	125	LENGTH 8		LENGTH 10	LENGTH 11	LENGTH 12	=		15	116 113 114	112 113 114	LENGTH S		LENGTH 5		LENGTH S	LENGTH S	LENGTH S
114 115	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH 1	LENGTH	LENGTH 15 164 165	121 122 123 124 125 LENGTH 14	122 123 124 125 LENGTH 13	123 124 125 LENGTH		LENGTH	LENGTH 1	109 & LENGTH 11	LENGTH	LENGTH	LENGTH 1	LENGTH 15	LENGTH 16	110 111 112 113 114 LENGTH 5		LENGTH S		LENGTH S			
114 115	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH 1	LENGTH	LENGTH 15 164 165	121 122 123 124 125 LENGTH 14	122 123 124 125 LENGTH 13	123 124 125 LENGTH		LENGTH	LENGTH 1		LENGTH	LENGTH	LENGTH 1	LENGTH 15	LENGTH 16	110 111 112 113 114 LENGTH 5							
114 115	LENGTH	LENGTH LENGTH	LENGTH IIS IIG III	LENGTH	LENGTH 1	LENGTH	LENGTH 15 164 165	121 122 123 124 125 LENGTH 14	122 123 124 125 LENGTH 13	123 124 125 LENGTH		2 LENGTH	LENGTH 1		LENGTH	LENGTH	LENGTH 1	LENGTH 15	LENGTH 16	110 111 112 113 114 LENGTH 5							
114 115	LENGTH	LENGTH LENGTH	LENGTH TIS 116 117 LENGTH	LENGTH LIS II S	LENGTH 1 119 120 121 111 115 121 121	HENGTH TENGTH	116 117 118 119 120 121 122 123 124 125 LENGTH 15	121 122 123 124 125 LENGTH 14	122 123 124 125 LENGTH 13	123 124 125 LENGTH	106 1 LENGTH	106 107 2 LENGTH	106 107 108 3 LENGTH 1		LENGTH	LENGTH	LENGTH 1	LENGTH 15	106 107 108 109 110 111 112 113 114 LENGTH 16	106 107 108 109 110 111 112 113 114 LENGTH 5							
	LENGTH 112 113 114 115 116	LENGTH LENGTH	LENGTH LIS	LENGTH	114 115 116 117 118 117 120 121	HENGTH TENGTH	LENGTH 15 164 165	121 122 123 124 125 LENGTH 14	117 118 119 120 121 122 123 124 125 LENGTH 13	118 119 120 121 122 123 124 125 LENGTH	105 106 1 LENGTH	105 106 107 2 LENGTH	105 106 107 108 3 LENGTH 1	105 106 107 108 109	LENGTH 104 104 104 104 104 104 104 104 104 104	LENGTH	LENGTH IN THE	LENGTH 115 0	105 106 107 108 109 110 111 112 113 114 LENGTH 16	105 106 107 108 109 110 111 112 113 114 LENGTH 5	LENGTH	22 LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	
109 110 111 112 113 114 115	LENGTH 112 113 114 115 116 116 116 116 116 116 116 116 116	LENGTH LENGTH	TENGII SII SII SII SII III DII	LENGTH TIS THE TIS THE TENGTH	I LENGTH LIST THE TIT THE TENGTH I	HENCH THE THE THE THE TENCH	115 116 117 118 119 120 121 122 123 124 125 LENGTH 15	116 117 118 119 120 121 122 123 124 125 LENGTH 14	117 118 119 120 121 122 123 124 125 LENGTH 13	118 119 120 121 122 123 124 125 LENGTH	105 106 1 LENGTH	105 106 107 2 LENGTH	105 106 107 108 3 LENGTH 1	105 106 107 108 109	LENGTH 104 104 104 104 104 104 104 104 104 104	105 106 107 108 109 110 111	LENGTH IN THE	LENGTH 115 0	105 106 107 108 109 110 111 112 113 114 LENGTH 16	105 106 107 108 109 110 111 112 113 114 LENGTH 5	LENGTH	22 LENGTH	23 LENGTH	24 LENGTH	25 LENGTH	26 LENGTH	27 LENGTH
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1.066	10.430	8748	990.6	8.384	7.702	7.020	6.339	5.657	4,975	4.293	2.270	2.270	2.270	2.270	2,270	2.270	2.270	2.270	2.270	2.270	11.464	10.782	10.100	9.418	8.736	8.055	7.373	6.691	
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7.336	8.018	2,223	2.905	3.586	4.268	056*7	5.632	6.314	566.9	7.677	8.359	2,223	5.905	3.586	892**	056**	5.632	6.314	566.9	7.677	8.359	2.223	5.905	3.586	4.268	4.950	5.632	6.314	966.9	
876 NOI.		104 NOI	526 NO.	086 NOI.	986 NOI.	10N 993	100 1001	10N 1010	10N 1020	ION 1031	ION 1043	10N 1056	10N 1060	ION 1065	101 NOT	10N 1078	10N 1086	10N 1095	10N 1105	10N 1116	10N 1128	ION 1141	10N 1145	ION 1150	10N 1156	10N 1163	1711 NOI	0811 NOI	100 1190	
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FIGURE 4-10a (Cont.)

7.677	8.359	2.223	5.905	3.586	4.268	4.950	5.632	6.314	966.9	7.677	8.359	2,223	5.905	3.586	4.268	4.950	5.632	6.314	966.9	1.677	8.359	2.223	5.905	3.586	4.268	4.950	5.632	6.314	966.9
1201	1213	1226	1230	1235	1541	1248	1256	1265	1275	1286	1298	1311	1315	1320	1326	1333	1341	1350	1360	1371	1383	1396	1400	1405	1411	1418	1426	1435	1445
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FIGURE 4-10a (Cont.)

TH 149		LOCATION 1456	1456	7.677
28 105 106 107 108 109 110 111 112 113 114 9 PATH 150 LENGTH 13		LOCATION	1468	8.359
_		LOCATION	1481	2.223
		LOCATION	1485	5.905
29 105 106 107 2 LENGTH 6		LOCATION	1490	3.586
29 105 106 107 108 3 LENGTH 7		LOCATION	1496	4.268
		LOCATION	1503	056**
29 105 106 107 108 109 110 5 LENGTH 9		LOCATION	1511	5.632
		LOCATION	1520	6.314
211		LOCATION	1530	966-9
29 165 166 167 108 169 110 111 112 113 6 PATH 159 LENGTH 12		LOCATION	1541	7.677
LENGTH LENGTH		LOCATION	1553.	8.359
107 106 109 110 11		LOCATION	1566	2.223
		LOCATION	1570	5.905
30 105 106 107 2 LENGTH 6		LOCATION	1575	3,586
30 105 106 107 108 3 LENGTH 7		LOCATION	1561	4.268
		LOCATION	1586	5.632
•		LOCATION	1597	6.314
211		LOCATION	1607	9.995
30 105 106 107 108 109 110 111 112 113 8		LOCATION	1618	7.677
30 105 106 107 108 109 110 111 112 113 114 9 A74 169		LOCATION	1630	6.359
PLOWING: 169	PATH SEGMENTS: 1642			
AVERAGE PAIN LENGIN IS V. / SEGRENIS				

TAXIMAY ONE-WAY PATHS. LINKS 0

NUMBER OF AIRLINES

5 AIRLINE CODES

AIRLINE GATES 1 A/C LATENESS DISTRIBUTION IN MINUTES (RANDOM NUMBER VERSUS TIME)

A/C SEPARATIONS
128 SEPARATIONS
128 SEPARATION VALUES IN 4 SETS OF 32. ARRIVAL / ARRIVAL. DEPARTURE / DEPARTURE /

THE ORDER OF SETS OF (X+Y) IS - (1-1)+ (1-2)+ (2-3)+ (2-4) (1-1)+ (1-2)+ (3-2)+ (3-4)+ (4-1)+ (4-2)+ (4-3)+ (4-4)

(N.HILES) . D/D (MINUTES) AND A/D (MINUTES)

LEAD A/C RUNNAY 1 128 SEPARATION VALUES IN 4 4.00 0.50 3.00 0.0 0.0 0.0 2.00 0.25 2.00 0.0 0.0 0.0 0.0 0.0 0.0 1.25 0.0

		AND A/D (MINUTES)
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FIGURE 4-10a (Cont.)

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FIGURE 4-10a (Cont.)

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190.15 DELAY = 0.68 190.83 DELAY = 0.68 197.30 DELAY = 6.46	194.66 DELAY = 0.67 197.30 DELAY = 2.31 198.40 DELAY = 1.10 198.40 DELAY = 1.05 199.09 DELAY = 0.29 199.19 DELAY = 0.69 227.22 DELAY = 0.10	27.22 DELAY =24.0 28.32 DELAY = 1.1 28.32 DELAY = 1.1 28.43 DELAY = 0.1 29.07 DELAY = 0.6	229,69 DELAY = 0,58 229,79 DELAY = 0,10 230,21 DELAY = 0,41 232,18 DELAY = 0,59 235,35 DELAY = 0,19 240,17 DELAY = 0,18 270,37 DELAY = 0,18	270,37 DELAY =28,39 270,37 DELAY =22,14 270,37 DELAY =16,38	277.95 DELAY =22.96 270.37 DELAY =14.47 270.37 DELAY =14.38	270.37 DELAY =12.47 277.95 DELAY =19.59 270.37 DELAY = 0.38 271.47 DELAY = 1.10 271.47 DELAY = 1.10 271.47 DELAY = 1.10 271.58 DELAY = 0.11 271.58 DELAY = 0.11
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FIGURE 4-10a (Cont.)

EXAMPLE 1

. . AVERAGE FLOW RATES . . .

	4	0.0	0.0	0.0												
	TURE	0.0	0.0	0.0												
	DEPARTURE C B	0.0	1.00	1.00												
		0.0	0.0	0.0			4	0.0	0.0	••	•	0.0		4	0.0	0.0
	TOTAL D	•	4	4			а В	0.0	0.0	0.0	a 5	0.0	URE	a	0.0 0.0	0.0
•	4		•				OFF GATE	0.0 1.00 0.0	0.0 0.0	0.0 1.00 0.0	TAXE-OUT	0.0 1.00 0.0	DEPARTURE	v		0.0
:		0.0	0.0	0.0			5	•	0.0	0	_	0.0	Ū	0	0.0	0.0
2.	9-6	0.0	0.0	0.0			TOTAL D	0 5	0	0 5	TOTAL	s		TOTAL	0	•
TIME - FROM 1. 0. 0 TO 2. 0. 0	TOUCH-AND-GO	0.0 0.0	0.0	0.0 0.0			10				5			10		
. 0.	Touc	0.0	0.0	0.0			4	0.0	0.0	0.0	4	0.0		4	0.0	•
ROM	ر		•	·	A.	18										•
	TOTAL D	٥	•	•	TOTAL	-	m ھ	.0	0.0	0.0	8		ب	60	0.0	
TIME					4		ON GATE	0.23 0.77 0.0	0.0 0.0 0.0	0.23 0.77 0.0	TAXI-IN	0.21 0.79 0.0	ARRIVAL	o	3 0.0 1.00 0.0	1 1.00 0.0 0.0 0.0
	4	0.0	0.0	0:0			٥	53		53	4 0	1.21	4	0		00
	A B	0.0	0.0		00	•	TOTAL		0		TOTAL	14 0		TOTAL	•	-
	ARRIVAL C B	0.71	98.0	0.79	v	12	101	13	•	13	101	-		101	f	-
	0	62.0	0.14	0.21	٥	•			GA	A.L			INTERSECTION	•	2	0
		0							9	TOTAL			RSEC	LINK NO.	132	133
	TOTAL	-	-	1,4		10							INTE	3		
						TOTAL										
	RMY NO.	-	~	TOTAL		GRAND TOTAL FLOM										

FIGURE 4-10a (Cont.)

0.0 0.0 0.0 0.0 0

4 0.25 0.75 0.0 0.0

TOTAL

EXAMPLE 1

...AVERAGE DELAY SUMMARY...

TIME - FROM 1. 0. 0 TO 2. 0. 0

AVERAGE DEPARTURE Runway Delay	0.0	0.29	0.29
AVERAGE ARRIVAL	77.0	0.73	65*0
RUNWAY		~	MEIGHTED AVERAGE
			EIGHTED

AVERAGE TAXI-OUT DELAY	RUNMAY DEPARTURE CROSSING TAXI-OUT	0.21	DEPARTURE AIRFIELD DELAY = 0.56
AVERAGE	Z X		LAY
XI-C	ING	0.0	0
T.	CROSS	•	AIRFIEL
			TURE
AGE DELAY	ARRIVAL TAXI-IN	0.18 0.23	DEPART
AVERAGE TAXI-IN DELAY	CROSSING TAXI-IN	0.18	3.95
	Ę,	5	ELA
AVERAGE GATE DELAY	RRIVAL DEPARTURE	0.05	RRIVAL AIRFIELD DELAY = 3.95
AVE	RRIVAL	5.95	RRIVAL

*** AVERAGE TRAVELITIME SUMMARY***

TIME - FROM 1. 0. 0 TO 2. 0. 0

AVERAGE DEPARTURE TRAVEL TIME	0.0	8.32	8,32
AVERAGE ARRIVAL: TRAVEL TIME	8.63	7.42	8.02
RUNWAY		N	WEIGHTED AVERAGE
			WEIGHTED

FIGURE 4-10a (Cont.)

EXAMPLE 1

. . . AVERAGE FLOW RATES . . .

	•	0.0	0.0	0.0													
	TURE	0.0	0.0	0.0													
	DEPARTURE C B	0.0	0.10	0.70													
		0.0	0.30	0.30			•	0.0	0.0	0.0	<	0.0		4	0.0	0.0	0.0
	TOTAL D	•	10	01			ю ш	0.0	0.0	0.0	8	0.0	JAE	60	0.0	0.0	0.0
		•		•			OFF GATE	0.27 0.73 0.0	0.0	0.73 0.0	TAXI-OUT	0.27 0.73 0.0	DEPARTURE	v	0.0	0.0 0.0 0.0	0.0 0.0
TIME - FROM 2. 0. 0 TO 3. 0. 0	4	0.0	0.0	0.0			TOTAL D	12.0	0.0	12.0	٥		٥	٥	0.0	0.0	0.0
10 3	TOUCH-AND-60	0.0 0.0	0.0	••			TOTAL	=	•	=	TOTAL	=		TOTAL	•	•	•
	DUCH-		0.0	0.0													
.5 MOI	TOTAL D	0.0	0.0	0.0	,		4	0.0	0.0	0.0	4	0.0		4	0.0	0.0	0.0
- 5	TOTAL	0	•	•	TOTAL	23	m m	0.0	0.0	0.0	60	0.0	ب	00	0.0		0.0
1.	;				•	•	ON GATE	0.73	0.0	0.73	TAXI-IN	0.31 0.69 0.0	APRIVAL	v	0.50	0.50	0.50
	•	0.0	0.0				•	0.27 0.73 0.0	0.0	0.27 0.73 0.0	0			0	0.50 0.50 0.0	0.50 0.50 0.0	0.50 0.50 0.00 0.0
	ARRIVAL C B	0:0	••	0.0 69.0			TOTAL	=		::	TOTAL	13		TOTAL	2	2	4
	A B B	0.50	98.0	0.69	U	91	•				-						
	٥	0.50	0.14	0.31	٥	-			GA	TOTAL			INTERSECTION	•	132	133	TOTAL
	TOTAL	•	-	13		207				-			NTERS	1.38			1
						OTAL F											
	SWY NO.		2	TOTAL		GRAND TOTAL FLOW											

...AVERAGE DELAY SUMMARY...

•	•
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-	•
2	
0	•
6	
2	•
FDOM	
TIME	

AVERAGE DEPARTURE RUNWAY DELAY	0.0	0.38	0.38
AVERAGE ARRIVAL	0.19	09.0	0.41
RUNWAY	-	2	WEIGHTED AVERAGE

5	RTURE	51	09.0
AVERAGE	DEPA TAXI-	•	AY .
AVERAGE TAXI-OUT DELAY	RUNWAY DEPARTURE CROSSING TAXI-OUT	0.0 0.15	DEPARTURE AIRFIELD DELAY = 0.60
AGE DELAY	ARRIVAL TAXI-IN	0.37 0.39	DEPARTURE
AVERAGE TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.37	10.79
AVERAGE GATE DELAY	ARRIVAL DEPARTURE	90.0	ARRIVAL AIRFIELD DELAY = 10.79
AVE	ARRIVAL	6,63	ARRIVAL

*** AVERAGE TRAVEL TIME SUMMARY **

TIME - FROM 2. 0. 0 TO 3. 0. 0

AVERAGE DEPARTURE TRAVEL TIME	0.0	8.36	8,36
AVERAGE ARRIVALI TRAVEL TIME	11.65	11.03	11,31
RUNWAY	The same and	2	WEIGHTED AVERAGE

EXAMPLE 1

.. DEPARTURE C B 0.0 0.0 0.0 0 9 0.22 0.78 0.0 0.78 0.0 0.22 TOTAL D 0.0 .. 0.27 0.73 0.0 0.0 0.0 .. TAXI-OUT 11 0.27 0.73 0.0 0.0 0.0 0.0 0.0 0.0 0.0 OFF GATE 0.27 0.73 0.0 0.0 0.0 . . . AVERAGE FLOW RATES . . . DEPARTURE ပ 0.0 .. TIME - FROM 3. 0. 0 TO 4. 0. 0 0.0 0.0 0.0 0.0 0 0.0 ٥ 0.0 0.0 0.0 0 0.0 TOTAL TOTAL D C B TOTAL = TOTAL 0.0 0.0 0 .. 0.0 0.0 0.0 0.0 0.0 TOTAL 20 11 0.18 0.82 0.0 10 0.20 0.80 0.0 0.0 0.0 0.0 0 10 0.20 0.80 0.0 3 0.0 1.00 0.0 1 0.0 1.00 0.0 **6**0 TOTAL D C TOTAL D C ARRIVAL 0.0 0.0 0:0 TOTAL D 0.17 0.83 0.0 0.20 0.80 0.0 0.18 0.82 0.0 ARRIVAL C B INTERSECTION LINK NO. TOTAL D TOTAL 45 132 133 GRAND TOTAL FLOW REY NO. TOTAL ~

FIGURE 4-10a (Cont.)

..

0:0

0.0

0.0

0.0

1.00 0.0

0.0

TOTAL

...AVERAGE DELAY SUMMARY...

TIME - FROM 3. 0. 0 TO 4. 0. 0

AVERAGE DEPARTURE RUNWAY DELAY	0.0	0,32	0,32
AVERAGE ARRIVAL	0.93	0.28	0.58
RUNWAY		~	AVERAGE
			WEIGHTED AVERAGE

	TURE		0.55
AGE F DELA	DEPARTAXI-0	0.17	
AVERAGE TAXI-OUT DELAY	RUNMAY DEPARTURE CROSSING TAXI-OUT	0.0	DEPARTURE AIRFIELD DELAY . 0.55
	5		RE AIR
AGE DELAY	ARRIVAL TAXI-IN	0.33 0.70	DEPARTU
AVERAGE TAXI-IN DELAY	CROSSING TAXI-IN	0.33	12.10
AVERAGE GATE DELAY	IRRIVAL DEPARTURE	40.0	RRIVAL AIRFIELD DELAY = 12.10
AVE	IRRIVAL	67.01	IRRIVAL

...AVERAGE TRAVEL TIME SUMMARY...

RUNMAY AVERAGE ARRIVAL: AVERAGE DEPARTURE TRAVEL TIME

NUMBER TRAVEL TIME TRAVEL TIME

1 18.30 0.0

2 13.55 8.89
WEIGHTED AVERAGE 15.71 8.89

EXAMPLE 1

		4	0.0	0.0	0.0													
		TURE B	0.0	0.0	0.0													
		DEPARTURE C B	0.0 0.0	0.85	0.85													
		٥	0.0	0.15	0.15			4	0.0	0.0	••	4	0.0		4	0.0	0.0	0.0
:		TOTAL D	•	13	13			es W	0.0	0.0	0.0	a 5	••	URE	00	0.0	••	••
* * * AVERAGE FLOW RATES * * *		<					14.	OFF GATE	10 0.20 0.80 0.0	0.0 0.0	0.20 0.80 0.0	TAXI-OUT	0.20 0.80 0.0	DEPARTURE	8	0.0 0.0 0.0 0	0.0 0.0 0	0.0 0.0
RAT	TIME - FROM 4. 0. 0 TO 5. 0. 0		0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0			TOTAL DOFF	0.20	0.0	0.20	TOTAL D	0.20		٥	0.0	0.0	.0.0
	2	TOUCH-AND-GO	0.0 0.0 0.0 0	•	•			TOTAL	2	•	01	TOTAL	9		TOTAL	•	•	•
F F L		TOUCH	0.0	0.0	•			•					0.0					•
0	ROM 4	TOTAL D	0.0	0.0		4	5		0.0	0.0	0.0	•			•	0.0	0.0	0.0
V E R	1 - 3	TOTA	•	•	•	TOTAL	25	. TE . B	0.0	0.0	0.0	2	5 0.	*	00	0.0	0.0	0.0
٠.	T	;	0.0	0.0	0.0	4		NO NO	0.82	0.0	0.18 0.82 0.0	TAXI-I	0.25 0.75 0.0	ARRIVAL	v	1.00	0.0	0.25 0.75 0.0
•					0	•	•	TOTAL D C C B	11 0.18 0.82 0.0	0.0 0.0 0.0 0	0.18	TOTAL D C	0.2		TOTAL D	3 0.0 1.00 0.0	1 1.00 0.0 0.0	
		ARRIVAL C B		30 0.	0.75 0.0	U	50	TOTAL	=	•	=	TOTAL	12		TOTAL		-	
			0.29 0.71 0.0	0.20 0.80 0.0										NO				
		٥			0.25	٥	8			8	TOTAL			INTERSECTION	LINK NO.	132	133	TOTAL
		TOTAL	1	s	12		FLOW							INTER	Š			
							TOTAL											
		Par NO.	-	2	TOTAL		GRAND TOTAL FLOW											

FIGURE 4-10a (Cont.)

EXAMPLE 1

...AVERAGE DELAY SUMMARY...

TIME - FROM 4. 0. 0 TO 5. 0. 0

AVERAGE DEPARTURE RUNWAY DELAY	0.0	65.0	0.59
AVERAGE ARRIVAL	1.11	0.30	0.77
RUNWAY	-	N	WEIGHTED AVERAGE
			WE JGHTE

AVERAGE FAXI-OUT DELAY	RUNWAY DEPARTURE	0.12	DEPARTURE AIRFIELD DELAY = 0.79
AVE TAXI-0	CROSSING	0.0	AIRFIELD DEI
AGE	ARRIVAL TAXI-IN	0.91 0.47	DEPARTURE
AVERAGE TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.91	18.56
AVERAGE GATE DELAY	ARRIVAL DEPARTURE	0.08	ARRIVAL AIRFIELD DELAY = 18.56
AVE	ARRIVAL	16.41	ARRIVAL

*** AVERAGE TRAVELITIME SUMMARY***

TIME - FROM 4. 0. 0 TO 5. 0. 0

AVERAGE DEPARTURE TRAVEL TIME	0.0	8.71	17.8
AVERAGE ARRIVAL! TRAVEL TIME	18.41	14.59	16.82
RUNWAY		~	AVERAGE
			WEIGHTED AVERAGE

EXAMPLE 1

		•	0.0	0.0	•												2	
		TURE	0.0	0.0	••													
		DEPARTURE C B	0.0	0.73	0.73													
		٥	0.0	12.0	0.27			4	0.0	0.0	0.0	4	0.0		4	0.0	0.0	0.0
•		TOTAL D	•	=	=			با ھ	0.0	0.0	0.0	e 9	0.0	URE	60	0.0	0.0	0.0
AVERAGE FLOW RATES		4						OFF GATE	0.25 0.75	0.0 0.0	0.75 0.0	TAXI-OUT	0.25 0.75 0.0	DEPARTURE	u	0.0	0.0	0.0 0.0
RAT	. 0 .		0.0	0.0	0.0			0	0.25	0.0	97.0	0			۵	0.0	0.0	0.0
	TIME - FROM 5. 0. 0 TO 6. 0. 0	TOUCH-AND-GO	0.0	0.0	0.0			TOTAL	12	•	15	TOTAL	12		TOTAL	•	•	•
F .		DUCH-	0:0	0.0	0.0								•					
A G E	OM 5.	-	0.0	0.0	0.0			4	0.0	0.0	0.0	*	0.0		*	0.0	0.0	0.0
E R	- 58	TOTAL	•	•	•	TOTAL	92	60 W	0.0	0.0	0.0	0	0.0		0	0.0	0.0	0.0
> × .	TIME					4		ON GATE	0.75	0.0	0.75	TAXI-IN	.0.73	ARRIVAL	v	19.0	0.0	0.40
:		4	0.0	0.0	•			•	0.25	0.0 0.0	0.25 0.75 0.0	4 0	0.27 .0.73 0.0	•	0	0.33	1.00	0.0 0.0 00.0
		Ak B		0.0		60	٠	TOTAL	12 0		12 0	TOTAL	15		TOTAL	3	2	5
		ARRIVAL C B	0.50 0.0	0.89	0.73	v	2	2	-		-	2			5			
		٥	0.50	0.11	0.27	٥	-			GA	TOTAL			INTERSECTION	LINK NO.	132	133	TOTAL
		TOTAL	•	•	15		FLOW							INTERS	2			•
							TOTAL											
		ANY NO.	-	2	TOTAL		GRAND TOTAL FLOW											

* * * * A V ERA G E D E L A Y S U H H A R Y * * *

TIME - FROM 5. 0. 0 TO 6. 0. 0

AVERAGE DEPARTURE RUNWAY DELAY	0.0	0.39	0.39
AVERAGE ARRIVAL	61.0	0.73	0.51
RUNNAY	-	~	WEIGHTED AVERAGE

	¥¥	RTURE	1.1	0.61
AVERAGE	TAXI-OUT DELAY	RUNWAY DEPARTURE	0.17	ELAY .
A	TAXI-	RUNMAY	0.0	DEPARTURE AIRFIELD DELAY = 0.61
MAGE	DELAY	ARRIVAL TAXI-IN	0.28 0.44	DEPARTURE
AVERAGE	TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.28	14.55
AVERAGE	GATE DELAY	ARRIVAL DEPARTURE	0.04	ARRIVAL AIRFIELD DELAY = 14.55
AVE	GATE	ARRIVAL	13.31	ARRIVAL

...AVERAGE TRAVEL TIME SUMMARY...

TIME - FROM 5. 0. 0 TO 6. 0. 0

AVERAGE DEPARTURE TRAVEL TIME	0.0	8.67	8,67
AVERAGE ARRIVAL	14.77	12,52	13,42
RUNMAY	•	2	WEIGHTED AVERAGE

FIGURE 4-10a (Cont.)

AIRPORT DELAY SIMULATION MODEL -- VERSION IID

A T A O T O A N

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A/C DEPARTURE RUNWAY OCCUPANCY TIME IN SECONDS (A/C CLASS. MEAN. AND STD. DEV.)
1 39.00 5.00
2 39.00 5.00
3 0.0 0.0
4 0.0 0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               TOUCH-AND-GO RUNWAY OCCUPANCY TIME IN SECONDS (A/C CLASS, MEAN, AND STD. DEV.)
1 25.00 2.00
2 25.00 2.00
3 0.0 0.0
4 0.0 0.0
                                                                                    5002
                                                                                      2008
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SATE SERVICE TIME IN MINUTES (A/C CLASS, MEAN, STD. DEV.)
1 35.00 10.00
2 21.00 5.00
4 0.0 0.0
                                                                                      2005 2006 2007
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           A/C APPROACH SPEED IN KNOTS (A/C CLASS, MEAN, STD, DEV.)
1 140.00 5.00
2 130.00 5.00
3 0.0 0.0
                                                                                                                                                                                                                                                                                                                                         RUNWAY NUMBERS AND THE LINKS WHICH CROSS THEM
2 132
2 133
                                                                                                                                                                                                                                                                                                                                                                                                   DEPARTURE QUEUE LENGTH AND INTERARRIVAL GAP
8 2.00
                                                                                      2004
                          NUMBER OF RANDOM NUMBER SEEDS
                                                                                                                START TIME AND FINISH TIME
                                                                       RANDOM NUMBER SEEDS
2001 2002 2003
                                                                                                                                                                                                                                                                                              RUNWAY END LINK NUMBERS
0 126
                                                                                                                                                                                                        NUMBER OF RUNMAYS
                                                                                                                                                          PRINT OPTIONS
                                                                                                                                                                                                                                                   RUNNAY MAMES
28L
EXAMPLE 1
```

MODEL RUN FOR EXAMPLE 1 - REDUCED GATE OCCUPANCY TIME FIGURE $\mathfrak{h}\text{-}10\mathfrak{d}$

LENGTHS OF COMMON APPROACH PATHS FROM GUTER MARKER TO THRESHOLD IN NAUTICAL MILES (RUNWAY NO., A/C CLASS, LENGTH) 1 2 8.00 1 3 0.00 2 1 8.00 2 2 8.00 2 4 0.0	RUNWAY EXIT SELECTIONUSAGE PERCENTAGE BY EACH A/C CLASS AND BY EACH RUNWAY (EXIT LINK NO. VERSUS PROBABILITY) CLASS 1 RWY 1 128. 0.40 129. 1.00 CLASS 2 RWY 1 128. 0.70 129. 1.00 CLASS 3 RWY 1 CLASS 3 RWY 1 CLASS 4 RWY 1		NUMBER OF EXITS 3 DISTANCE IN FEET FROM THRESHOLD TO THE EXIT TAXIWAY (EXIT LINK NO. VERSUS DISTANCE) 128 6000.0 129 8000.0 101 6000.0	THE ARRIVAL RUNWAY OCCUPANCY TIME IN SECONDS BY A/C CLASS (DISTANCE IN FEET FROM THRESHOLD TO EXIT TAXIWAY VERSUS 1 CLASS 1 1000.0 12.00 2000.0 21.00 3000.0 29.00 4000.0 38.00 5000.0 47.00 1000.0 56.00 7000.0 73.00 9000.0 82.00	.0 47.00		OF AN	FIGURE 4-10b (Cont.)
HOLD IN NAU	ND SY EACH		INK NO. VER	OISTANCE IN FE 38.00 5000.0 82.00	38.00 5000.0 82.00			
ER 10 THRES	AVC CLASS. A		AAY (EXIT L	4000.0 4000.0 9000.0	0000		5	
ER MARK	FACH		17 TAXIV	29.00 73.00	73.00	,	8	30.00
FROM OUT	ENTAGE BY		0 THE EX.	3000.0	3000	,	Q	25.00
A THE	1.00 1.00		SHOLD TO	21.00 65.00	21.00		3	20.00
A 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	129. 129.		ROM THRE	2000.0	70000.0	AREAS IRS	ZING AREA	XP. 15.00
OF COMMON	EXIT SELECT 1 RWY 1 8 0.40 2 RWY 1 8 0.70 9 RWY 1	2 2 RWY 100 2 3 RWY 2 2 2 RWY 2 2 2 8 RWY 2 2 2 8 RWY 2 2 2 2 8 RWY 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	EXITS IN FEET F	12.00 56.00	12.00 56.00	NUMBER OF HOLDING AREAS	NUMBER OF G/A HOLDING AREAS 0 G/A HOLDING AREA NUMBERS	TAXING SPEEDS IN MPH
LENGTHS	CLASS 128. CLASS 2 CLASS 2 CLASS 3 CLASS 3	CLASS 1 RWY 101. 101. CLASS 2 RWY 1 CLASS 3 RWY 1 CLASS 4 RWY 0 CLASS 4 RWY	NUMBER OF EXITS 3 DISTANCE IN FEE	CLASS 1 1000.00 6000.0	CLASS 3	HOLDINS A	NUMBER OF 6 AVECT	TAXIINE S

TIME

ON CONTRACT																																																																	
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ONE-WAY	-																																																																
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	121		122	123	124	125	3	126																											FIGURE 4-10b (Cont.
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DAT	90	0	109	110	111	:	711	113	114	115	:	9	117	104	104	104		50	104	104	101	5	105	104	104	104		5	104	104	104	104			*
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FIGURE 4-10b (Cont.)

10 10 10 10 10 10 10 10
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FIGURE 4-10b (Cont.)

		in (cont)	FIGHT 1-10h (Cont)						
6.995	1190	LOCATION		=		: =	107	113	PATA
6.314	1180	LOCATION		01	LENGTH	25 105 106 107 108 109 110 111 6 ATH 117 55 105 106 107 108 109 110 111 112	107	117	PATE
5.632	11.11	LOCATION		•	LENGTH	•	101	116	PATO
056**	1163	LOCATION		00	LENGTH		101	115	PATO
4.268	1156	LOCATION		-	LENGTH	£ 80	101	114	PATE
3.586	1150	LOCATION		9	LENGTH	2	101	ATH 113	PATE
2,905	1145	LOCATION		S	LENGTH	The same of the	- :	ATH 112	PATH
2,223	1141	LOCATION		01 , 511	LENGTH	211 111 011 601 80	101	111	PATH
8,359	1128	LOCATION			LENGTH	= :	101	105 106	PATH
7.677	1116	LOCATION		12	LENGTH	Z4 105 106 107 108 109 110 111 112	101	105 106	2474
566.9	1105	LOCATION		=	LENGTH	= :	101	108	PATH
6.314	1095	LOCATION		01	LENGTH		107 1	105 106	PATH
5,632	1086	LOCATION		•	LENGTH		1 101	105 106	PATH
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4.268	1071	LOCATION		-	LENGTH	08 3	107	105 106	PATH
3,586	1065	LOCATION		•	LENGTH	2	107	24 105 106 107 2	PATH
2,905	1060	LOCATION		v	LENGTH		-	105 106	PATH
2,223	1056	LOCATION		115 4	113 114 LENGTH	23 105 106 107 108 109 110 111 112 TH 101	107 1	105 106	PATH
8,359	1043	LOCATION			113 114 LENGTH		107 1	105 106	PATH
7,677	1031	LOCATION		12	LENGTH	Ξ	107 1	105 106	PATH
566.9	1020	LOCATION		=		Ξ	101	105 106	PATH
6.314	1010	LOCATION		10	LENGTH	Ξ	107 1	105 106	PATH
5.632	1001	LOCATION		•	LENGTH	S.	101		PATH
4.950	666	LOCATION		00	LENGTH	4	101	23 105 106 107 108 109 17H 95	PATH
4.269	986	LOCATION		-	LENGTH	08 3	107 1	23 105 106 107 108 ITH 94	PATH
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2,905	975	LOCATION		S	LENGTH	A THE REAL PROPERTY.	-	23 105 106 ATH 92	PATH
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8.018	656	LOCATION		12	LENGTH		108 1	106 107	PATH
7.336	876	LOCATION		=	LENGTH			68	PATH
))

FIGURE 4-10b (Cont.)

115	119						:	-	LENGTH	12		LOCATION	1201	7.677
	120	9						, ,	ENGTH			LOCATION	1213	8,359
Colorido 123 Colorido 124 Colo	121	90	20	108			=	7	ENGTH	2	0	LOCATION	1226	2,223
10 10 10 10 10 10 10 10	122	90	-						LENGTH			LOCATION	1230	2.905
108 3	123	90	02						ENGTH			LOCATION	1235	3.586
109 109 4	124	90	07 1		m				ENGTH	1		LOCATION	1241	4.258
100 110 11 12 12 12 13 14 10 10 10 10 10 10 10	125	06 1	07 1	08 10	6			-	ENGTH			LOCATION	1248	4.950
100 100 11 11 11 11 11	126	06 1	07 1	08 10	1 6	9	v		ENGTH	•		LOCATION	1256	5.632
100 100 11 11 11 12 11 11	127		07 1	08 10	1 6				ENGTH	01		LOCATION	1265	6.31
100 100 11 12 13 8	128	06 1	07 10	08 10	1 6		=======================================	15 L	ENGTH	=		LOCATION	1275	66.9
108 109 110 111 12 13 14 14 15 10 10 10 10 10 10 10	129	90	07 1	08 10	1 6		11	12 1	13 B			LOCATION	1286	7.67
100 100 111 112 113 14 15 10	130	90	07 1	90 10	1 6		=======================================	7 7	13 114 ENGTH	61		LOCATION	1298	8,35
108 109 110 12 12 13 13 14 15 15 15 15 15 15 15	131	90	1 10	98 10	6		=======================================	1 21	ENGTH	4	01	LOCATION	1311	2.22
106 3	132	90	-						ENGTH			LOCATION	1315	2.90
108 13	133	90	20					-	ENGTH			LOCATION	1320	3,58
108 109 4	134	96	07 10	90	m				ENGTH	7		LOCATION	1326	4.25
108 109 110 15 LENGTH 9 LOCATION 1341 LENGTH 10 LENGTH 11 LENGTH 12 LENGTH 11 LENGTH 12 LENGTH 12 LENGTH 13 LENGTH 13 LENGTH 13 LENGTH 13 LENGTH 14 LENGTH 15 LENGTH 15 LENGTH 15 LENGTH 16 LENGTH 17 LENGTH 18 LENGTH 19 LOCATION 1418 LENGTH 10 LENGTH 10 LENGTH 10 LENGTH 11 LENGTH 10 LENGTH 11 LENGTH 10 LENGTH 11	135	90	07 1	98 10	0	,			ENGTH			LOCATION	1333	4.95
108 109 110 111 6 LENGTH 10 LOCATION 1350 108 109 110 111 112 113 8 LENGTH 11 LOCATION 1350 108 109 110 111 112 113 114 9 LENGTH 13 LENGTH 13 LENGTH 13 LENGTH 13 LENGTH 6 LOCATION 1383 108 109 110 111 112 113 114 115 10 LENGTH 6 LOCATION 1405 108 109 110 5 LENGTH 7 LOCATION 1418 108 109 110 111 6 LENGTH 10 LOCATION 1435 108 109 110 111 112 113 8 LENGTH 11 LENGTH 10 LOCATION 1445 108 109 110 111 112 113 8 LENGTH 11 LENGTH 1	136	90	07 1	08 10	1 6		S		ENGTH	•		LOCATION	1341	5.63
108 109 110 111 112 113 18 19 10 108 109 110 111 112 113 14 115 119 119 119 119 119 119 119 119 119	137	90	07 1	08 10	6				ENGTH	10		LOCATION	1350	6.31
108 109 110 111 112 113 114 9 LENGTH 1371 108 109 110 111 112 113 114 115 10 LOCATION 1383 2 LENGTH 5 LENGTH 6 LOCATION 1406 108 109 4 LENGTH 6 LOCATION 1418 108 109 4 LENGTH 6 LOCATION 1418 108 109 110 111 6 LENGTH 9 LOCATION 1426 108 109 110 111 6 LENGTH 10 LOCATION 1435 108 109 110 111 112 113 8 LENGTH 11 LOCATION 1445	138	06 1	07 1	08 10	1 6		11 11	12	ENGTH	=		LOCATION	1360	66.9
108 109 110 111 112 113 114 115 10 2	139	1 90	07 1	08 10	6		= :	12 1	13 B			LOCATION	1371	7.67
108 109 110 111 112 113 114 115 10 LENGTH 5 LENGTH 6 LOCATION 1400 LENGTH 6 LOCATION 1405 LOCATION 1411 LENGTH 8 LOCATION 1418 LOCATION 1426 LOCATION 1445	140	90	1 10	90 10	6			7 71	LENGTH	•		LOCATION	1383	8.35
2 LENGTH 5 LOCATION 1400 108 3 LENGTH 6 LOCATION 1405 108 109 4 LENGTH 7 LOCATION 1411 108 109 110 111 6 LENGTH 9 LOCATION 1426 108 109 110 111 12 12 13 8 LOCATION 1445	141		07 1	98 10				12 11	ENGTH	115	0	LOCATION	1396	2.22
108 3 LENGTH 6 LOCATION 1405 108 109 4 LENGTH 7 LOCATION 1411 108 109 110 111 6 LENGTH 9 LOCATION 1426 108 109 110 111 12 12 12 LENGTH 11 LOCATION 1445 108 109 110 111 112 113 8	145	90	- :					_	ENGTH			LOCATION	1400	2.90
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S LENGTH 8 LOCATION 1418 111 6 LENGTH 9 LOCATION 1426 111 112 LENGTH 10 LOCATION 1435 111 112 LENGTH 11 LOCATION 1445	144	90	1 10	80	m .			-	ENGTH	7		LOCATION	1411	4.26
111 6 LENGTH 9 LOCATION 1426 111 112 7 111 112 113 8 111 112 113 8	145	90	10 10	99 10		,		-	ENGTH			LOCATION	1418	4.95
111 0 LENGTH 10 LOCATION 1435 111 112 7 LENGTH 11 LOCATION 1445 111 112 113 8	146	9 3		90			n :	٠,	ENGTH			LOCATION	1426	5.63
111 112 113 8 11 LENGTH 11	147	9 3		90					ENGTH			LOCATION	1435	6.31
	148	1 90	07 16	18 10	6 6				ENGTH	=		LOCATION	1445	66.9

FIGURE 4-10b (Cont.)

7.677	8,359	2,223	5.905	3.596	4.258	056.4	5.632	6.314	566.9	7.677	8.359	2,223	2.905	3,586	4.268	5.632	6.314	566.9	7.677	8.359	
LOCATION 1456	LOCATION 1468	LOCATION 1481	LOCATION 1485	LOCATION 1490	LOCATION 1496	LOCATION 1503	LOCATION 1511	LOCATION 1520	LOCATION 1530	LOCATION 1541	LOCATION 1553	LOCATION 1566	LOCATION 1570	LOCATION 1575	LOCATION 1581	LOCATION 1588	LOCATION 1597	LOCATION 1607	LOCATION 1618	LOCATION 1630	
																	and a second				PATH SEGHENTS: 1642
	LENGTH 13	LENGTH	LENGTH S	LENGTH 6	LENGTH 7	LENGTH 8		LENGTH 10		112 113 8 LENGTH 12	113 114 LENGTH	LENGTH 4	LENGTH S	LENGTH 6	LENGTH 7		LENGTH 10		LENGTH 12	112 113 114 9 LENGTH 13	
28 105 106 107 108 109 110 111 112	ATM 150		- :	2 201	107 108 3	177 155 106 107 108 109 4	ATH 156	29 105 106 107 108 109 110 111 ATH 157	29 105 106 107 108 109 110 111 112 4TH 158	29 105 106 107 108 109 110 111 112 4TH 159	29 105 106 107 108 109 110 111 112	111 011 601 801 101	- :	107 2	5 901 /01	* 601 801 /01	30 105 106 107 108 109 110 111 477 166	ATH 167	30 105 106 107 108 109 110 111 112	30 105 106 107 108 109 110 111 112 30 105 106 107 108 109 110 111 112	THIS AIRPORT USES THE FOLLOWING: 169 LINKS: 54 PATHS: 169 AVERAGE PATH LENGTH IS 9.72 SEGHENTS
PATH 149	PATH 150	PATH 151	PATH 152	PATH 153	PATH 154	PATH 155	PATH 156	29 105 106 PATH 157	PATH 158	29 105 106 PATH 159	29 105 106 PATH 160	PATH 161	20 105 106 PATH 152	30 105 106 107 PATH 163	PATH 164	947H 165	20 105 106 PATH 166	PATA 167	PATH 168	30 105 106 108 30 105 106 1	THIS AIRPORT LINKS: SA AVERAGE PATH

TAXIBAY ONE-BAY PATHS LINKS 0 NUMBER OF AIRLINES

5 AIRLINE CODES AIRLINE GATES • 4 5

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A/C LATENESS DISTRIBUTION IN MINUTES (RANDOM NUMBER VERSUS TIME)

A/C SEPARATIONS

128 SEPARATIONS

128 SEPARATION VALUES IN 4 SETS OF 32, ARRIVAL / ARRIVAL, DEPARTURE / ARRIVAL, DEPARTURE / D

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20.00	000				0.0	0.0	0.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.50	0.0	0.0	0.0	0.0	0.0	0.0	200	0.0	0.0	0.0	0.0	0.0							
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-	000				0.0	0.0	0.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NAAN	TON VALU	0.50	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	•••								
4 00 A	3					0.0	00.1	0.0	••	0.0	0.0	••	•••	0.0	LEAD AZC RU	EDARAT	00.	••	0.0				•			0.	••	•								
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FIGURE 4-10b (Cont.)

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Cont.
4-10b
FIGURE

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FIGURE 4-10b (Cont.)

EXAMPLE 1

* * * * VERAGE FLOW RATES * * *

TIME - FROM 1. 0. 0 TO 2. 0. 0

	4	0.0	0.0	0.0													
	STURE B	0.0	0.0	0.0													
	DEPARTURE C B	0.0	1.00	1.00													
	TOTAL D	0.0	0.0	0.0			4	0.0	0.0	0.0	4	0.0		4	0.0	0.0	
	TOTAL	•	6	S			es W	0.0	0.0	0.0	. E	0.0	URE	00	0.0	0.0	
	4			0			TOTAL D C	0.14 0.86 0.0	0.0 0.0 0.0	0.14 0.86 0.0	TAXI-OUT	0.14 0.86 0.0	DEPARTURE	TOTAL D C	0.0	0.0	
	4	0.0	0.0	0.0			0	0.14	0.0	0.14	٥			٥	0.0	0.0	
	TOUCH-AND-GO	0.0	0.0	0.0 0.0			TOTAL	•	•	1	TOTAL	1		TOTAL	•	•	
:	OUCH	0.0	0.0														
	TOTAL D	0.0	0.0	0.0	_		<	0.0	0.0	0.0	4	0.0		4		0.0	
	TOTAL	•	•	•	TOTAL	19	بة 8	0.0	0.0	0.0		0.0	٦	100		0.0	
	٠,				4		ON GATE	0.77	0.0	17.0	AXI-IN	0.21 0.79 0.0	ARRIVAL	U	1.00	0.0	
		0.0	0.0	0.0			TOTAL D ON	0.23 0.77 0.0	0.0 0.0 0.0 0	0.23 0.77 0.0	TOTAL D C			TOTAL D C	0.0 0.1 0.0	1.00 0.0	
	ARRIVAL C B	0.0	0.86 0.0	0.79 0.0			OTAL	13		13	OTAL	14		OTAL	6	-	
	C ARR	0.71	0.86		U	16	-							•			
	٥	0.29	0.14	0.21	٥	٣			49	TOTAL			INTERSECTION	LINK NO.	132	133	
	TOTAL	1	1	*		FL04				-			INTERS	LINK			
						OTAL											
	RMY NO.	-	2	TOTAL		GRAND TOTAL FLOW											

. . . AVERAGE FLOW RATES . . .

	•	•••	0.0	0.0													
	TURE	0.0	0.0	0.0													
	DEPARTURE C B	0.0	0.82	0.82													
	٥	0.0	0.18	0.18			•	0.0	0.0	0.0	•	0.0		4	0.0	0.0	0.0
	TOTAL D	•	=	=			<b>6</b> 0	0.0	0.0	0.0	8	0.0	URE	00	0.0	0.0	0.0
_							OFF GATE	0.80	0.0	0.0 08.0	TAXI-OUT	10 0.20 0.80 0.0	DEPARTURE	v	0.0	0.0	0.0
TIME - FROM 4. 0. 0 TO 5. 0. 0	4	0.0	0.0	0.0			TOTAL D	0.20	0.0	0.50	٥	0.20	Ĭ	٥	0.0	0.0	0.0
10 5	TOUCH-AND-GO		0.0	0.0			OTAL	10	•	10	TOTAL	01		TOTAL	•	•	•
0.0	DUCH-	0.0	0.0	0.0													
. *	-	0.0	0.0	••			* · ·	0.0	0.0	0.0	•	0:0		4	0.0	0.0	0.0
- FR	TOTAL D	•	•	•	TOTAL	23	ь В	0.0	0.0	0.0	60	0.0	_	00	0.0	0.0	0.0
TIME					4		ON GATE	0.25 0.75	0.0	0.25 0.75 0.0	TOTAL D TAXI-IN	0.25 0.75 0.0	ARRIVAL	v	3 0.0 1.00 0.0	1.00 0.0	0.25 0.75
	¥	0.0	0.0	0.0	60		۵	9.55	0.0	3.45	-	9.55	•	٥	0.0	00.1	9.55
	ARRIVAL C B	0.0		0.75 0.0	_		TOTAL	12		12 (	TAL	12		TOTAL	9	-	
	ARR	0.71	0.80 0.0	0.75	u	18	7				7			2			
	٥	0.29	0.20	0.25	٥	s			GA.	TOTAL			INTERSECTION		132	133	TOTAL
	1074	•	10	15		200				-			INTERS	LINK NO.			-
						SPAND TOTAL FLOW											
	3		~	4		9											
				104		5											

FIGURE 4-10b (Cont.)

...AVERAGE DELAY SUNMARY...

TIME - FROM 4. 0. 0 TO 5. 0. 0

AVERAGE DEPARTURE RUNWAY DELAY	0.0	0.50	05.0
AVERAGE ARRIVALI RUNWAY DELAY	1.02	0.30	0.72
RUNWAY	-	2	AVERAGE
			EIGHTED AVERAGE

<b>&gt;</b>	TURE	•	0.73
AGE T DELA	DEPAR TAXI-0	0.19	AY -
AVERAGE TAXI-OUT DELAY	RUNWAY DEPARTURE CROSSING TAXI-OUT	0.0	RFIELD DEL
GE ELAY	ARRIVAL AXI-IN	0.70 0.31	DEPARTURE AIRFIELD DELAY = 0.73
AVERAGE TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.70	4.47
AVERAGE GATE DELAY	ARRIVAL DEPARTURE	9.05	ARRIVAL AIRFIELD DELAY = 4.47
AVE	ARRIVAL	2,73	ARRIVAL

## ...AVERAGE TRAVEL TIME SUMMARY...

TIME - FROM 4. 0. 0 TO 5. 0. 0

AVERAGE DEPARTURE TRAVEL TIME	0.0	8.76	8.76
AVERAGE ARRIVAL	69.6	7.23	8.67
RUNMAY		2	WEIGHTED AVERAGE

EXAMPLE 1

...AVERAGE FLOW RATES ...

TIME - FROM 5. 0. 0 TO 6. 0. 0

DEPARTURE C B A	0.0 0.0 0.0 0.0	0.0	•••													
RTURE	0.0	0.0	0.0													
DEPAR	0.0	0.10	0.70													
٥	0.0	0.30	0.30			•	•••	••	•••	•	:		•			
TOTAL D	•	97	01			OFF GATE OFF CATE	0.27 0.73 0.0	0.0 0.0 0.0	0.27 0.73 0.0	TOTAL D C C B A	11 0.27 0.73 0.0	LURE	TOTAL D C 8	0.0		0.0
						45 C	0.73	0.0	0.73	TAXI-0	0.7	DEPARTURE	u	0.0	0:0	0.0
•	0.0 0.0 0.0		0.0			5	12.0	0.0	12.0	٥	0.27		0	0.0 0.0	0.0	0.0 0.0
ND-60	0.0	0.0	0.0			DTAL	=		=	OTAL	=		OTAL	•	•	•
A-HOD	0.0	0.0	0.0													
6	0.0	0.0	0.0			<		0.0	0.0	•			•		0.0	
TOTAL D C B	•	•	•	TOTAL	52	60	0.0	0.0		•			•	0.0	0.0	0.0
				4		ON GATE B	0.31 0.69 0.0	0.0 0.0	0.31 0.69 0.0	TOTAL D TAXI-IN B	0.27 0.73 0.0 0.0	ARRIVAL		0.33 0.67 0.0	1.00 0.0	4. 0.50 0.50
4		0.0				٥	15.	0.	.3	٤.	0.27	•	٥	.33	.00	.50
40				•	•	TOTAL	13 0		13 0	*	15		TOTAL	-	_	
ARRIVAL C B	0.50 0.0	0.89 0.0	0.73 0.0	v	2	101	=		7	101			5			
TOTAL D	0.50	0.11	0.27	۰	-			₹9	TOTAL			INTERSECTION	9	132	133	TOTAL
TOTAL	•	•	15		FLOW				-			INTERS	LINK NO.			-
					GRAND TOTAL FLOW											
REY NO.	-	~	TOTAL		GRAND											

...AVERAGE DELAY SUMMARY...

TIME - FROM 5. 0. 0 TO 6. 0. 0

AVERAGE DEPARTURE RUNWAY DELAY	0.0	0.57	0.57
AVERAGE ARRIVALI RUNWAY DELAY	0.24	0.78	0.56
RUNWAY	1	2	AVERAGE
			WEIGHTED AVERAGE

JE DELAY	DEPARTURE	0.15	67.0 = 1
AVERAGE TAXI-OUT DELAY	RUNMAY DEPARTURE CROSSING TAXI-OUT	0.0	DEPARTURE AIRFIELD DELAY = 0.75
AGE DELAY	ARRIVAL TAXI-IN	0.45 0.29	DEPARTURE A
AVERAGE TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.45	2.94
AVERAGE GATE DELAY	ARRIVAL DEPARTURE	0.03	ARRIVAL AIRFIELD DELAY = 2,94
AVER	ARRIVAL	1.64	ARRIVAL A

# ...AVERAGE TRAVELITIME SUMMARY...

#### TIME - FROM 5. 0. 0 TO 6. 0. 0

AVERAGE DEPARTURE TRAVEL TIME	0.0	8.84	8.84
AVERAGE ARRIVAL! TRAVEL TIME	8.16	6.17	7,32
RUNWAY	•	~	AVERAGE
			WEIGHTED AVERAGE

FIGURE 4-10b (Cont.)

***AVERAGE DELAY SUMMARY***

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2
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TIME
F

AVERAGE DEPARTURE RUNWAY DELAY	0.0	0,33	0,33
AVERAGE ARRIVALI RUNWAY DELAY	0.44	44.0	65.0
RUNMAY		2	WEIGHTED AVERAGE

	URE		95.0
AVERAGE TAXI-OUT DELAY	EPART	0.0 0.18	
AVERAGE	> 9 ₹		DELAY
TAXI	RUNWAY DEPARTURE CROSSING TAXI-OUT	0.0	AIRFIELD
AGE DELAY	ARRIVAL TAXI-IN	0.30 0.36	DEPARTURE AIRFIELD DELAY = 0.56
AVERAGE TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.30	1.81
AVERAGE GATE DELAY	RRIVAL DEPARTURE	90.0	RRIVAL AIRFIELD DELAY = 1.81
AVE	RRIVAL	95.0	RRIVAL

# • • • A V E R A G E T R A V E LI T I M E S U M M A R Y • • • TIME - FROM 1. 0. 0 TO 2. 0. 0

AVERAGE DEPARTURE TRAVEL TIME	0.0	8.38	8,38
AVERAGE ARRIVALI TRAVEL TIME	8.36	6.59	7.48
RUNWAY	-	2	WEIGHTED AVERAGE

FIGURE 4-10b (Cont.)

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					•	TIME	A .	N G E	TIME FROM 2. 0. 0 TO 3. 0. 0	3 0	4 0	. s	•				
TOTAL D C B	0		۶. 9		4		TOTAL	20	TOTAL D C B A	09-0			TOTAL D	٥	DEPARTURE C B	TURE	
6 0.50 0.50 0.0	0.50		0.0				•	0.0	0.0 0.0 0.0 0.0		•	_	•	0.0		0.0 0.0	
7 0.14 0.86 0.0	0.0 98.0	0.0 98.0	0.0		0.0		•	0.0 0	0.0 0.0 0.0	0.0	•	•	=======================================	0.27	0.27 0.73 0.0	0.0	0.0
13 0.31 0.69 0.0	0.31 0.69 0.0	0.0 69.0	0.0				•	0.0	0.0	0.0	0.0 0.0		=	0.27	0.27 0.73 0.0	0.0	••
8 U	v		•			4	TOTAL										
GRAND TOTAL FLOW 7 17 0	7 17 0	17 0	•				28										
TOTAL D						ON GATE	В	<	5	TAL.	٥	TOTAL. D C	60	•			
12 0.33				0.33		0.67	0.33 0.67 0.0 0.0		•	::	15.0	0.27 0.73 0.0	0.0	0.0			
GA 0.0 0.0 0.0 0.0 0.0		0.0	0.0	0.0		0.0	0.0	0.0			0.	0.0 0.0 0.0	0.0	0.0			
TOTAL 12 0.33	12	12 0.33	0.33	0.33		0.67	0.33 0.67 0.0 0.0	0:0		:	1.27	0.27 0.73 0.0	0.0	0.0			
TOTAL D C	TOTAL D	TOTAL D	'AL 0 T	-		NI-IN		•		TAL	٥	TOTAL D C B	8	4			
13 0.31 0.69 0.0	13 0.31	13 0.31	13 0.31	0.31		0.69	0.0	0.0		=	12.0	0.27 0.73 0.0	0.0	0.0			
Z				•	-	ARRIVAL	ب					DEPARTURE	JRE				
LINK NO. TOTAL D C		TOTAL D	IAL O	0		U		4		TAL	٥	TOTAL D C 8	60	<			

FIGURE 4-10b (Cont.)

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1.00 0.0 0.0 1.00 0.0 0.0 0.50 0.50 0.0

132 133 TOTAL

...AVERAGE DELAY SUMMARY...

TIME - FROM 2. 0. 0 TO 3. 0. 0

AVERAGE DEPARTURE RUNWAY DELAY	0.0	71.0	0.77
AVERAGE ARRIVALI RUNHAY DELAY	0.20	0.63	0.43
RUNMAY		~	WEIGHTED AVERAGE
			WEIGHTE

	4.1		2
**	PATUR	=	0
AVERAGE AXI-OUT DELAY	DEP!	0.11	*
AVERAGE	70		DEL
TAX	RUNMAY DEPARTURE CROSSING TAXI-OUT	0.0	AIRFIELD
IGE ELAY	ARRIVAL AXI-IN	0.34 0.19	DEPARTURE AIRFIELD DELAY = 0.93
AVERAGE TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.34	2.79
			AY .
	URE	90.0	DEL
AVERAGE GATE DELAY	DEPART		AIRFIELD
AVE	RRIVAL DEPARTURE	1.83	RRIVAL AIRFIELD DELAY . 2.79

# ...AVERAGE TRAVEL TIME SUMMARY...

#### TIME - FROM 2. 0. 0 TO 3. 0. 0

AVERAGE DEPARTURE TRAVEL TIME	0.0	9.89	6.89
AVERAGE ARRIVALI TRAVEL TIME	9.00	•.9•	7,43
RUNWAY		2	WEIGHTED AVERAGE

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...AVERAGE FLOW RATES ...

			0.0 0.0														
	TURE B	•••		•••													
	TOTAL D C B		9.78	9.75													
	٥	• • •	12 0.25	0.25			•	:	:	:	•	:		•	:	:	:
	TOTAL	•	~	21					:	:	5	:	JAN	•	:	:	:
	•	•	•	•			TOTAL D C C 8 A	12 0.17 0.03 0.0 5.0		12 0.17 0.63 0.0	TOTAL 0 CC 6 A	12 0.17 0.03 0.0 51	DEPARTURE	101AL 0 C . A			••• ••• ••• •
:		•	•	•••			•		:		•	-		•	:	:	:
2	9-CM	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	:			TOTAL	21	•	21	TOTAL	2		TOTAL	•	•	•
:		:	:	:													
	-	:	:				•	:	:	:	•	•		•	:	:	:
TIME - FROM 3. 0. 0 TO 4. 0. 0	TOTAL D C B A	•	•	•	TOTAL	2		:	:	:	•	:		•	:	:	:
1146							TOTAL D ON GATE . A	10 0.20 0.00 0.0 0.0	0.0 0.0 0.0 0	10 0.20 0.00 0.0	TOTAL O TAXI-IN . A	11 6.16 6.62 6.6 6.0	APPIVAL	10TAL 0 C .	3 0.0 i.00 0.0 t.	1 0.0 1.00 0.0 0.0	1.0 1.00
	:	:	:	:			•	.20	•	.20	-	=		•	•	•	•
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	ARRIVAL B		0.17 0.83 0.0	0.02 0.0	v	=	2	-	Ī	-	2			5			
	۰	5 0.20 0.80 0.0 0.0	0.17	9.18	۰	•			3	TOTAL			INTERSECTION	LINK NO.	132	133	TOTAL
	TOTAL	•	•	=		FLOW				-			INTERS	2			-
						TOTAL											
	RWY NO.	-	~	TOTAL		GRAND TOTAL FLOW											

FIGURE 4-10b (Cont.)

... AVERDE DELAY SURRARY....

TIME - FROM 3. 0. 0 TO 4. 0. 0

AVERAGE DEPARTURE RUNNAY DELAY	•••	*:	***
PUNEASE ARRIVAL	1.00	.29	
AVERAG	•	•	•
RUNNAY		~	AVERAGE
			FIGHTED AVERAG

1 DELAY	DEPARTURE	0.20	IY . 0.71
AVERAGE TAXI-OUT DELAY	RUNBAY DEPARTURE CROSSING TAXI-OUT	••	DEPARTURE ATRETELD DELAY = 0.71
AGE DELAY	ARRIVAL TAXI-IN	0.41 0.35	DEPARTURE
AVERAGE TAKI-IN DELAY	PUNNAY ARRIVAL	14.0	3.53
AVERAGE GATE DELAV	ARRIVAL DEPARTURE		APPIVAL AIRFIELD DELAY . 3.53
SATE	ARRIVAL	2.16	APRIVAL

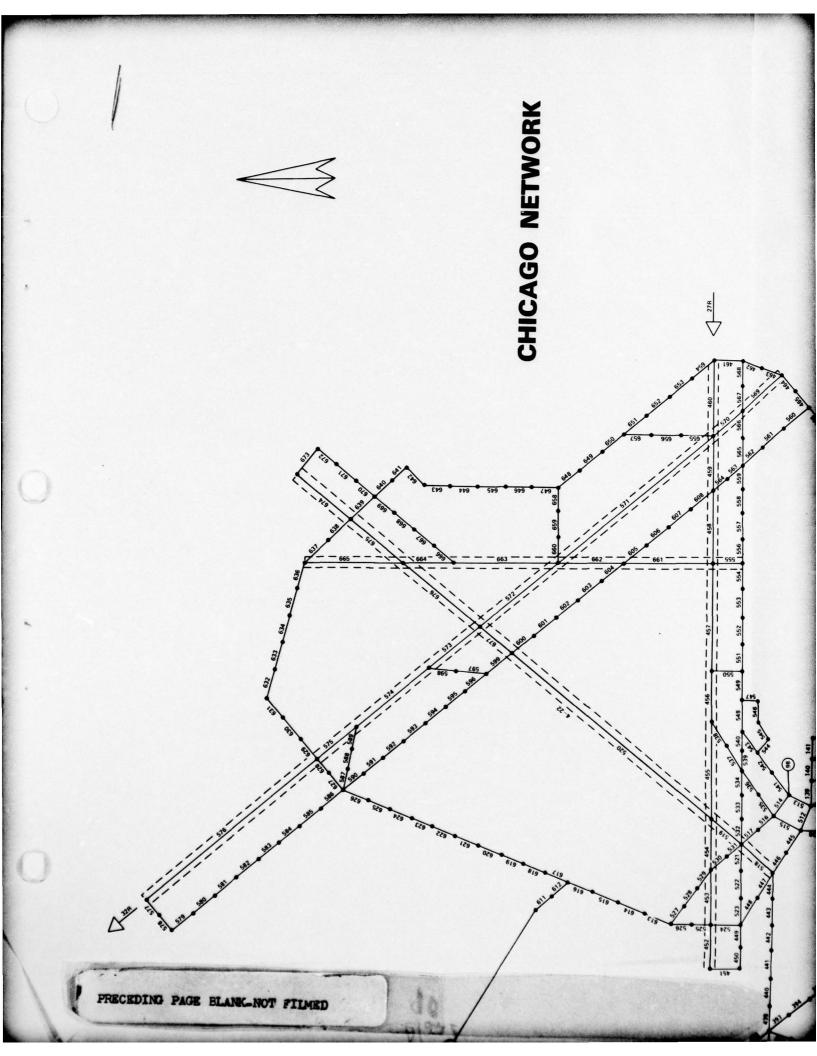
... AVERAGE TRAVEL TIME SURMARY... TIME - FROM 3. 6. 0 TO 4. 6. 0

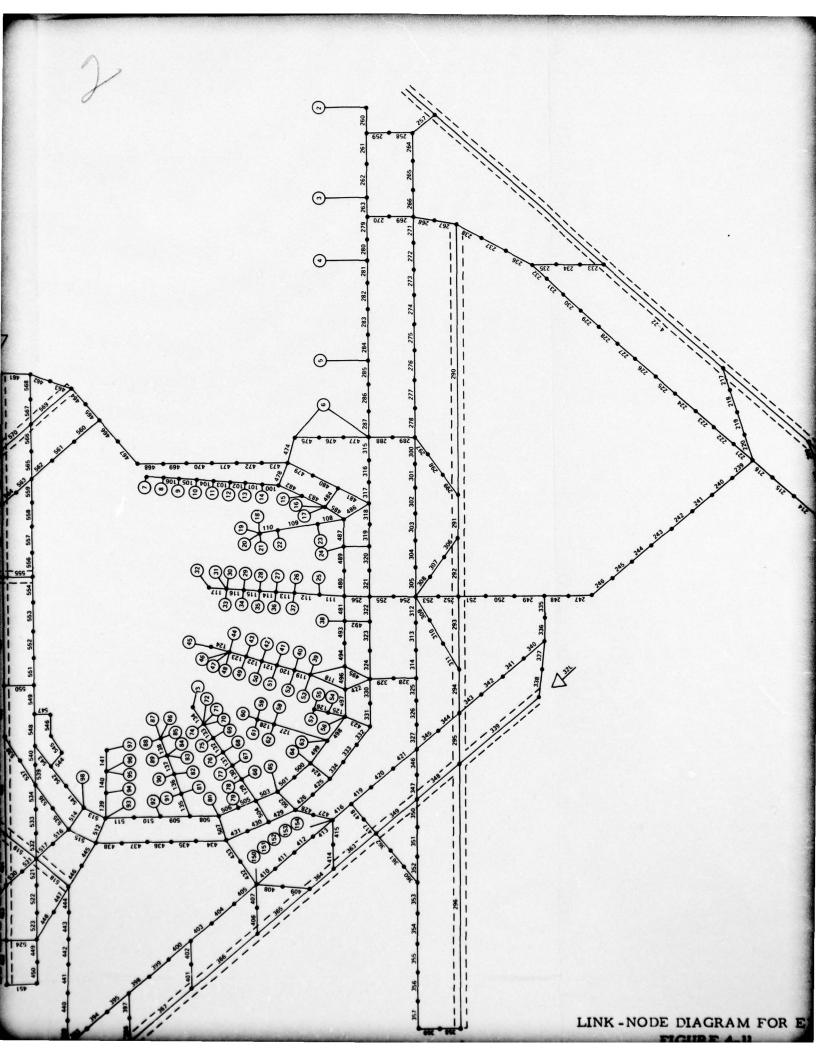
AVERAGE DEPARTURE TRAVEL TIME .. AVERAGE ARRIVAL 10.13 7.09 RUNMAY

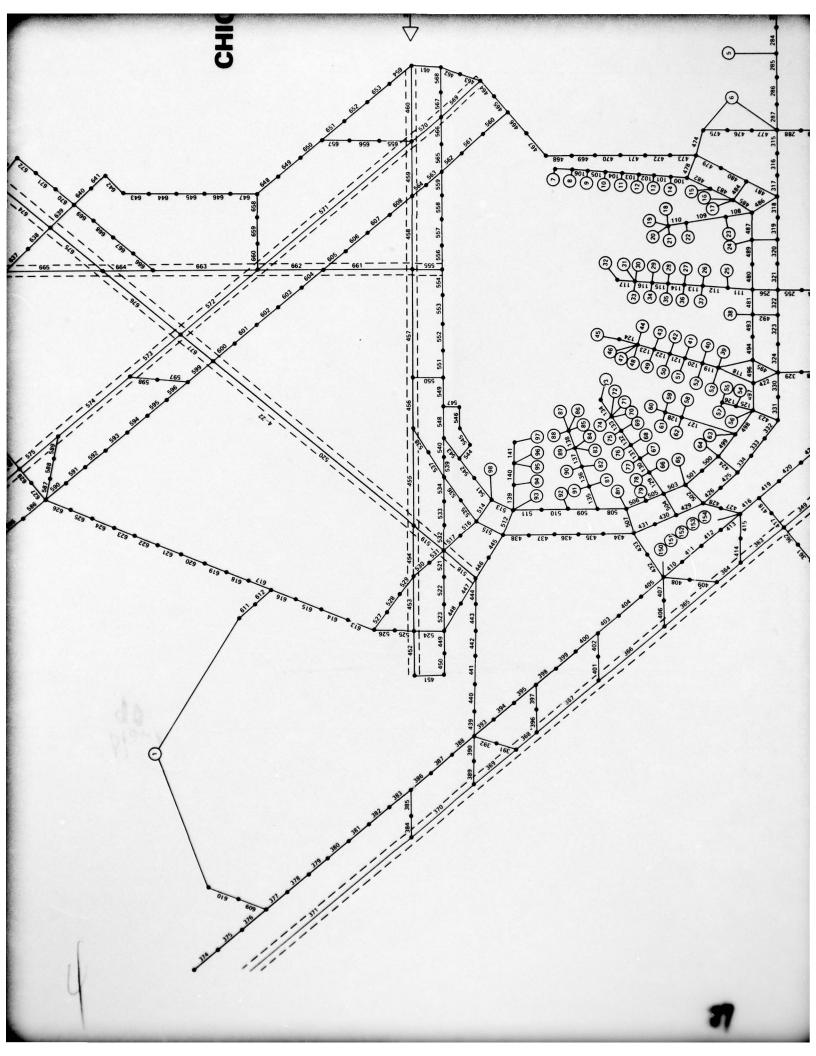
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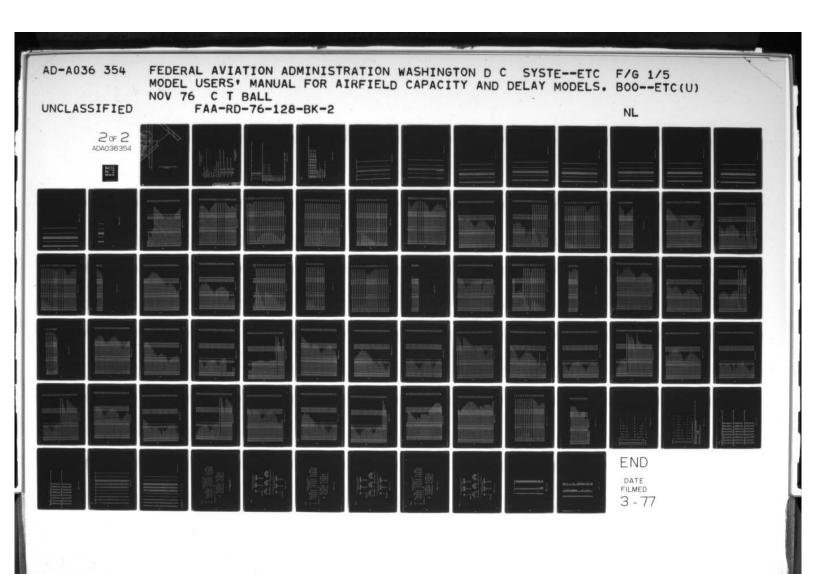
WEIGHTED AVERAGE

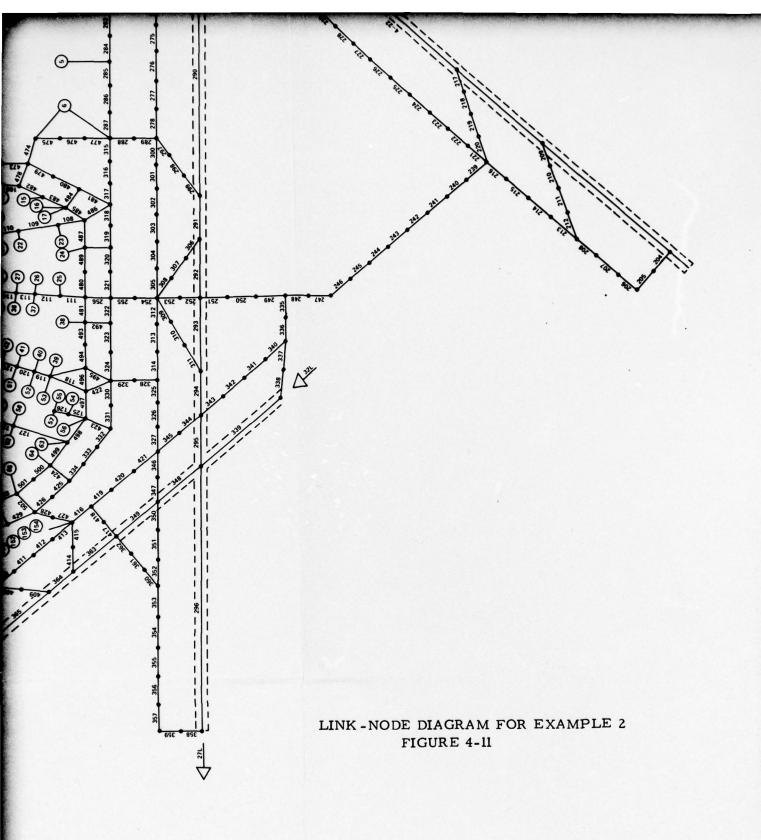
FIGURE 4-10b (Cont.)











#### AIRPORT DELAY SIMULATION MODEL--VERSION IID

#### N P C T D G N I

EXAMPLE 2

RANDOM NUMBER SEEDS	SEEDS 102 2003 2004 2005 2006 2007 2008 2009 2010	AND FINISH TIME 4: 0		IAYS	18 27 <u>L</u> 32R	END LINK NUMBERS 0 257 464	AUNWAY NUMBERS AND THE LINKS WHICH CROSS THEM	QUEUE LENGTH AND INTERARRIVAL GAP 2.00	RUNWAY OCCUPANCY TIME IN SECONDS (A/C CLASS. MEAN. AND STD. DEV.)  00 5.00  00 5.00  00 3.00  00 2.00	NUMMAY OCCUPANCY TIME IN SECONDS (A/C CLASS. MEAN. AND STD. DEV.)  10 7.00  10 3.00  10 3.00	Z	SPEED IN KNOTS (A/C CLASS. MEAN. STD. DEV.) .00 5.00 .00 5.00 .00 5.00 .00 5.00
MBER SE		SH TIME	ú		27.5	19ERS 257	THE LIN	GTH AND	5.00 5.00 3.00		3.00 3.00 2.00 2.00	N N N N N N N N N N N N N N N N N N N
	RANDOM NUMBER SEEDS 2001 2002		I SNOI	RUNWAYS	MES 27R	D LINK NUP	MBERS AND			-60 RUNWAY 72.00 72.00 23.10		APPHOACH SPEED 1 140.00 2 130.00 3 120.00 4 95.00
NUMBER OF	RANDOM NUI	START TIME	PRINT SPITONS	YUMBER OF	RUNMAY NAMES	RUNMAY EN	AUNMAY NU	DEPARTURE 8	A/C DEPARTURE 1 35. 2 30. 3 2.9	TOUCH-AND	GATE SERV	A/C APPRO

INPUT VALUES FOR EXAMPLE 2 (Obtained from Model Run) FIGURE 4-12

LENGTHS OF COMMON APPROACH PATHS FROM OUTER MARKER TO THRESHOLD IN NAUTICAL MILES (RUNWAY NO., A/C CLASS, LENGTH)

QUNARY EXIT SELECTION--USAGE PERCENTAGE BY EACH A/C CLASS AND BY EACH RUNWAY (EXIT LINK NO. VERSUS PROBABILITY)

CLASS 1 RWY 1 0.63 401. 0.53 391. 1.00

CLASS 2 RWY 1 1.00

CLASS 3 RWY 1 1.00

CLASS 1 RWY 2 2 1.00

CLASS 3 RWY 3 2 1.00

CLASS 3 RWY 3 2 1.00

CLASS 3 RWY 3 3 1.00

1.00 1 RWY CLASS 3 RWY CLASS 2 RWY REY 4 RWY CLASS 3 RWY CLASS 0: CLASS 1 CLASS

AUMBER OF EXITS

CLASS 4 PWY

JISTANCE IN FEET FROM THRESHOLD TO THE EXIT TAXIMAY (EXIT LINK NO. VERSUS DISTANCE) 405 4460.0 401 5480.0 391 6800.0 538 4330.0 519 5480.0 530 6080.0

THE ARRIVAL RUNNAY OCCUPANCY TIME IN SECONDS BY A/C CLASS (DISTANCE IN FEET FROM THRESHOLD TO EXIT TAXIWAY VERSUS TIME)

CLASS 1
100:00 12:00 2000:0 21:00 3000:0 29:00 4400:0 82:00 5500:0 55:00

CLASS 2
100:00 62:00 6800:0 64:00 8000:0 73:00 9000:0 82:00 5500:0 50:00

CLASS 3
100:00 12:00 2000:0 21:00 3000:0 73:00 9000:0 82:00 55:00

CLASS 3
100:00 12:00 2000:0 21:00 3000:0 73:00 9000:0 82:00

CLASS 4
100:00 56:00 6800:0 65:00 8000:0 73:00 9000:0 82:00

CLASS 4
100:00 56:00 6800:0 65:00 8000:0 73:00 9000:0 82:00

CLASS 5
100:00 56:00 6800:0 65:00 8000:0 73:00 9000:0 82:00

CLASS 6
100:00 56:00 6800:0 65:00 8000:0 73:00 9000:0 82:00 154 153 HOLDING AREA NUMBERS 150 151 152 NUMBER OF HOLDING AREAS

FIGURE 4-12 (Cont.)

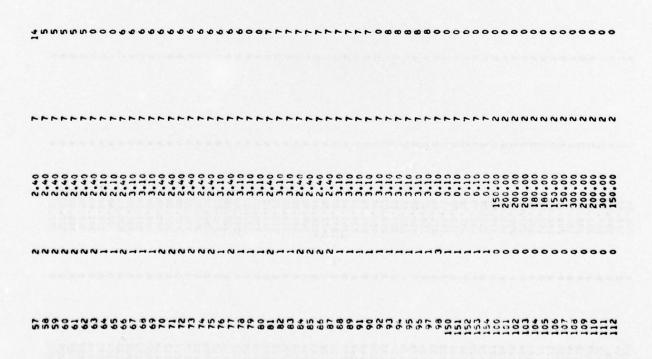
NUMBER OF G/A HOLDING AREAS

G/A HOLDING AREA NUMBERS

35.00

FAXING SPEEDS IN MPH 5.00 10.00 15.00 23.00 25.00

FIGURE 4-12 (Cont.)



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FIGURE 4-12 (Cont.)

FIGURE 4-12 (Cont.)

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FIGURE 4-12 (Cont.)

8.489	8.716	8.016	8.016	8.016	9.016	8.716	8.716	8.786	8.239	8.676	39.46	8.847	9.108	9.108	9.108	5,343	9.343	8.814	8.443
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7.850	7,391	8.580	8.409	6.239	8.734	7.830	8,303	7,375	7.848	7.690	7.342	2000	1.969	7.269	7.269	7.269	7.042
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FIGURE 4-12 (Cont.)

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FIGURE 4-12 (Cont.)

FIGURE 4-12 (Cont.)

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FIGURE 4-12 (Cont.)

FIGURE 4-12 (Cont.)

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FIGURE 4-12 (Cont.)

8.399	8.229	9.724	7.820	8.293	7,365	7.838	7.480	7.332	6.632	164.1	7,259	7.259	7.259	7.032	6.877	6.922	6.392	5.767	8.0.4	901.4	2.108	325 7	
479 478	479 478	479 478	479 478	479 478	479 478	817 617	483 15	16	11	109 110	109 110	109 110	109 110	109 22	5					62	116 30	116 31	116 117
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319	319	319	319	319	319	319	319	319	319	319	319	319	319		488	52	112	112	112	112	112	112	
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331	331	331	331	331	331	331	331	331	331	331	331	331	331		331	331	331	331	331	331	331	331	331
332	332	332	332	332	332	332	332	332	332	332	332	332	332		332	332	332	332	332	332	332	332	332
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334	334	334	334	334	334	334	334	334	334	334	334	334	334		334	334	334	334	334	334	334	334	334
425	425	425	425	425	425	425	425	455	455	425	425	425	425		425	425	425	425	425	455	425	455	455
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FIGURE 4-12 (Cont.)

FIGURE 4-12 (Cont.)

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FIGURE 4-12 (Cont.)

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5434	9259	9276	9534	9312	9330	6346	9367	9384	0076	9415	6756	2446	9453	9976	0480	5676	9510	9526	0543	965.0		9214	4964	9603	9616	9629	9635	2796	0596	9658
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515	21.0		210	1	616	515	515	515	515	515	515	515	212	215	515	515	215	515	515	515	515	515	515	515	515	515	2 5	2 3	572	2
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0.732		9.884	9.356	9.985	6.392	7.933	9.447	9.276	9.106	9.601	8.697	9.170	8.242	6.735	8.357	6.209	1.509	•••36
	•	301	301	301	301	301	319	319	319	319	319	319	319	319	319	319	319	310
		305	305	305	302	305	320 319	320	320	320	320	320	320	320	320	320	320	320
		303	303	303	303	303	321	321	321	321	321	321	321	321	321	321	321	351
		307	304	304	304	304					255			255	255	552	255	555
		305	305	305		305	52	752	52	52	52	52	254 255	52	52	\$52	52	52
		315	312 305 304 303	312 305	312 305	312 305	312 254 255	312 254 255	312 254 255	312 254 255	312	312	312	312	312 254	312 254	312 254 255	315
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1996	9672	LOCATION 9686 327 326 325 314 313 312 305 304 303 302	LOCATION 9733			916		933	314		314		138	176				LOCATION 10316 327 326 325 314 313 312 254 255 321 320 319
		325	325 325	LOCATION 9777 327 326 325 314	LOCATION 9818 327 326 325 314	LOCATION 9855 327 326 325 314	LOCATION 9889 327 326 325 314	LOCATION 9933 327 326 325 314	LOCATION 9976 327 326 325 314	LOCATION 10018 327 326 325 314	LOCATION 10059 327 326 325 314	LOCATION 10099 327 326 325 314	LOCATION 10138 327 326 325 314	LOCATION 10176 327 326 325 314	LOCATION 10213	LOCATION 10248 327 326 325 314	LOCATION 10282 327 326 325 314	325
LOCATION	LOCATION	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326
Š	Š	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327
		124	121	421	421	421	451	421	121	421	421	421	421	421	421	421	421	124
		2	24	450	450	450	420	450	450	450	450	450	450	450	450	450	450	65
		13 416 419 420 421	202 201 200 2	614	419	412 413 416 419 420 421	412 413 416 419 420 421	419	61,	412 413 416 419 420 421	412 413 416 419 420 421	412 413 416 419 420 421	412 413 416 419 420 421	413 416 419 420 421	413 416 419 420 421	413 416 419 420	412 413 416 419 420	61,
		5	416	5	416	116	416	416	416	416	116	416	416	416	416	416	416	• 10
		13	413	413	413	113	.:	413	413	413	13	13	13	413	13	13	413	£13
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s	1	612 611 1 47 410 411 412	281 280 279 263 LENGTH 44 404 405 410 411	281 280 279 263 3 LENGTH 41 404 405 410 411 412 413 416 419 420 421	37 410 412 413 416 419 420 421	410 411	LENGTH 44	104 105 106 107 7 LENGTH 43 404 405 410 411 412 413 416 419 420 421	104 105 106 8 LENGTH 42 104 405 410 411 412 413 416 419 420 421	LENGTH 41 404 405 410 411	410 411	39	410 411	410 411	35 410 411	410 411	410 411	LENGTH 36 411 412 413 416 419 420 421
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		403	282	282	282	403		103	603	60	103 104 403 404	103 11 LENGTH	12	403	* 03	403	403	*63
		613	m 0	m 0	-	004	004	v 0	N 0	v 0				-	007	004	00	
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		398					398								398	398	398	
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		523				394	38									38	36.	- 46
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PATH	SIS	391	391	391	391	391	391	PATH 391	391	391	391	391	391	391	318	391		125

FIGURE 4-12 (Cont.)

FIGURE 4-12 (Cont.)

7.644	7.644	7.815	7.615	7,985	7.985	7,985	8.212	7.309	7.243	(0	6.748	6,007	6/00/	7.180	7.880	7.350	7.350	7.577	1.577	1.577	8.277	7.748	
112	112	112	112	112	112	112	112								2,	20	122	122	122	122	122	182	152	
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256	256	256	556	556	555	256	256	38			0,	25	120	120	120	120	120	120	120	120	120	120		
255	255	555	255	255	255	255	255	764	é	53	119	119	119	119	119	119	119	119	119	119	119	119	119 120	
52	752	752	524	52	52	254	254	323		118	118	118	118	118	118	118	118	118	118	118	118	118	118	
312	315	312	315	312	312	312	312	324		564	495	564	495	569	495	495	495	495	567	495	567	495	567	
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613	619	419	419	419	419	419	419	419	419	419	419	419	619	419	419	419	419	419	61,	419	614	419	419	
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004	004	400	004	004	400	400	004	004	000	007	007	400	400	400	00	007	400	004	007	007	004	400	007	
399	399	399	399	399	399	398 399 400	399 400	300	366	399	398 399 400	398 399 400	399	399	399 400	399	399	399	399 400	399	399	399	399	
398	398	395 398 399 40	398	398 399 400	398 399 400	398	398	398	398	398	398	398	398	338	398	398	398	398	398	398	398	398	398	
394 395 398 399 40	394 395 398 399 40	395	395 398 399 400	395	395	395	395	116 117 32	395	395	395	395	395	395	395	395 398	395	395	395	395	395	395	395	
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FIGURE 4-12 (Cont.)

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FIGURE 4-12 (Cont.)

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FIGURE 4-12 (Cont.)

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FIGURE 4-12 (Cont.)

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327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327
421	451	421	421	451	451	451	451	451	451	451	451	451	421	421	421	421	421	124	421	421	124	451	451	123	124	451	451	421	124
420	450	450	450	450	450	450	450	450	450	450	450	450	450	420	420	420	420	450	420	420	420	450	450	450	450	450	450	450	
119 420	416 419 420 421	416 419 420 421	415 419 420 421	416 419 420 421	416 419 420 421	416 419 420 421	416 416 420 421	416 419 420 421	416 419 420 421	416 419 420 421	415 419 420 421	416 419 420 421	416 419 420 421	416 419 420 421	416 419 420 421	135	736	737	738	739 420 421	416 419 420 421	416 419 420 421	416 419 420 421	416 419 420 421	416 419 420 421	416 419 420 421	416 419 420	*16 419 420 421	*16 419 420
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LOCATION 17439	2011	LOCATION 17466	LOCATION 17481	LOCATION 17497	LOCATION 17514	10CATION 17532		LOCAL TO 1 1 2 3 1	LOCATION 17569	LOCATION 17587	LOCATION 17605	LOCATION 17622	LOCATION 17638		LUCATION 17833	LOCATION 17667	LOCATION 17680	LOCATION 17690	LOCATION 17701	01221	01111	LOCATION 17719	LOCATION 17728	LOCATION 17738	LOCATION 17748	LOCATION 17758	LOCATION 17767	LOCATION 17775	LOCATION 17782	LOCATION 17787	LOCATION 17794	LOCATION 17802	
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154	421	421	5		421	451	421	421	2		7	441	451	451	421		77.	455	455	425	425	425	1	C	5	\$3	455	455	455	65	503	503	
450	450	420	3			450	450	420	424		2	450		450	420			456	456	426	426	426		9	924	426	456	426	924	205	205	502	1
749 416 419 420 421 327 326 325 328	416 419 420 421 327 326 325 328	151	752 751 751 757 754 754 754 754	753	416 419	416 419 420 421 327 326 325 328	416 419 420 421 327 326 325 328	416 419 420 421 327 326 325	757 754 154 754 914 314	758	759	416 419 420 421 327 326 325 328 760	416 419	416 419 420 421 327 326 325 328	762	763	TH 764	427 428 426 425 424 499 498 125 765	427 428 426 425 424 499 498 125	427 428 426 425 424 499 498	427 428 426 425 424 499 498	769 426 425 424 499 127	769	770 427 428 426 425 424 499 127 128	771	427 428 426 425 424 499 127 128	427 428 426 425 424	427 428 426 425 424	427 428 426 425 424	50 427 428 502 1TH 776	150 427 428 502 503 129	427 428 502 503 129 130 67 778 427 428 502 503 129 131	27
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5.083 5.311 5.481 5.011 5.013 5.013 5.013 7.497 3.797 3.513

5.181 5.408

FIGURE 4-12 (Cont.)

LOCATION 17811	LOCATION 17831	LOCATION 17843	LOCATION 17854	LOCATION 17866	LOCATION 17877	LOCATION 17887	LOCATION 17896	LOCATION 17904	LOCATION 17911	LOCATION 17917	LOCATION 17922	LOCATION 17929	LOCATION 17937	LOCATION 17946	LOCATION 17955	LOCATION 17965	LOCATION 17975	LOCATION 17985	LOCATION 17995	LOCATION 18004	LOCATION 18012	LOCATION 18019	LOCATION 18026	LOCATION 1803S	LOCATION 18045	LOCATION 18056	LOCATION 18067	LOCATION 18079
LENGTH 10	133 70 LENGTH 11	133 71 LENGTH 11	133 72 LENGTH 12	LENGTH 11	LENGTH 10	LENGTH 9	LENGTH 8	LENGTH 7	LENGTH 6	LENGTH S	LENGTH 7	LENGTH 8	LENGTH 9	LENGTH 9	LENGTH 10	BS LENGTH 10	BENGTH 10	BT LENGTH 10	BB LENGTH 9	LENGTH 8	LENGTH 7	LENGTH 7	LENGTH 9	LENGTH 10		LENGTH 11	LENGTH 12	LENGTH 10
		132	132	132	2		2							6	*	138	138	138	138	80				6	139		651	
131				5	502 503 129 130 131	: 3	; ;						85	137	13	137	137	137	137	137	6	\			115	2115	116	
130	130	130	130	2	130	2	25	2 4				6	136	136	9	136	136	136	136	136	_	1	92	510	210	210	010	510
129	129	129	120	120	129	120	120	120	2		35.	5	135	135	5	135	135	135	135	135	135	135	209	209	506	500	200	200
503	503	503	505	505	503	503	50.00	503	200	3	0 0	000	508	508	200	208	208	508	209	208	208	208	208	508	906	208	800	508
205	205	505	505	205	205	203	202	505	202	3	200	0	201	203	205	201	201	201	507	201	201	507	201	507	205	207	200	507
779 427 428 502 503 129 130 131 132			783	784	785	786	787	798	789 502	790	191	792	432 433 507 508 135	432 433 507 508 135 136 137	795	432 433 507 508 135 136 137 138	432 433 507 508 135 136 137 138	432 433 507 508 135 136 137 798	432 433 507 508 135 136 137 138	432 433 507 508 135 136 137 800	432 433 507 508 135 901	432 433 507 508 135	432 433 507 508 509	432 433 507 508 509 510 511 804	805	432 433 507 508 509 510 511	807	432 433 507 508 509 510 511
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4.324 4.324 4.324 4.324 4.592 3.688 4.183 3.729 3.688 4.183 4.527 4.304 4.304 4.527 4.299 4.529 4.6811 5.038

FIGURE 4-12 (Cont.) .

LOCATION 18773 116 117 32 LOCATION 18795	116 33 10CATION 18815	34 34 10CATION 18836	OCATION 18855	CATION 18633	LUCATION 18873	LOCATION 18890		LOCATION 18931	LOCATION 18946	LOCATION 18962	LOCATION 18979	LOCATION 18997		LOCATION 19034			20001 10114301	Carron 19067	LOCATION 19103			LOCATION 19155	LOCATION 19166	LOCATION 19184	LOCATION 19193		OCATTON 19211	LOCATION 19221	
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	325				325	325				528						125									86	86			27
926	920	956	92	956	956	926	926	97	926	156	126	92	97	92	126	126 3	97	126	126	92	97	66	7 66	30	66	7 66	66	66	66
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23	21 3	21 3	21 3	21 3	21 3	21 3	21 3	21 3	21 3	21 3	21 3	2	21 3	21 3	21 3	21 3	21 3	21 3	21 3	21 3	21 3	52 4	55 4	03 1	52 4	55 4	55 4	52 4	55 4
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839 6 419 420 421 327 326 325	19 4	19 4	19 4		419 420 421 327 326 325		6	19 4	19 4	19 4	19 4	19	19 4	19 4	19 4		419 420 421	19 4	19 4	19 4			28 4	28 5	28 4		28 4	58 4	78 6
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9.349

3.513

3.763

6.011 5.311 5.311

5.946 5.718 5.377 5.907 5.063 5.083 5.083 5.083 5.083 5.083

FIGURE 4-12 (Cont.)

3.990	3,763	3.342	2.872	2.585	3.483	4.389	765.4	161.7	4.324	4.324	4.324	569.9	4.324	160.4	765**	3.698	4,183	3,729	3.674	3.599	4.527	111.4	4.077	400.4	4°304	4004	\$.004	111.7	4.527
LOCATION 19231	LOCATION 19241	LOCATION 19250	LOCATION 19258	LOCATION 19265	LOCATION 19270	LOCATION 19277	LOCATION 19285	LOCATION 19294	LOCATION 19304	LOCATION 19315	LOCATION 19326	LOCATION 19337	LOCATION 19349	LOCATION 19360	LOCATION 19370	LOCATION 19379	LOCATION 19387	LOCATION 19394	LOCATION 19400	LOGATION 19405	LOCATION 19412	LOCATION 19420	LOCATION 19429	LOCATION 19438	LOCATION 19448	LOCATION 19458	LOCATION 19468	LOCATION 19478	LOCATION 19487
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4.299	4.015	4.356	4.811	5.038	5.038	8.299	1.499	7.618	7.089	7.335	7.010	6.639		5.665	7.180		0000	6 976			270 5	5.242	6.570	5.870	5.870		633	3.0.0	67.6
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19495	19502	19509	19518	19528	19539	19550	9562	9572	9605	9635	101	479 478 100 101	284	9760	10780	100	101	479 478 100 101	101	40	90.00	9958	9778	109 110 18 LOCATION 20000	2000	300	1	9900	23 23
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FIGURE 4-12 (Cont.)

20124 20124 20157 20157 20157 20158 20216 20235 20278 20278 20239 20319 20338	20387 20400 20414 20429 20445 20445 20446 20445 20446 20445 20480 20517 20535 20530 20570 20570 20570
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LOCATION 20124 LOCATION 20124 LOCATION 20140 LOCATION 20157 LOCATION 20194 29 LOCATION 20214 LOCATION 20215 LOCATION 20216 LOCATION 20219 LOCATION 20219 LOCATION 20219 LOCATION 20219 LOCATION 20318 LOCATION 20318	LOCATION 20387 LOCATION 20409 LOCATION 20445 LOCATION 20445 LOCATION 20465 LOCATION 20499 LOCATION 20599 LOCATION 20596
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17 25 321 320 486 14 255 256 111 12 17 25 256 111 112 18 255 256 111 112 19 25 256 111 112 21 25 256 111 112 21 25 256 111 112 21 25 256 111 112 21 25 256 111 112 21 25 256 111 112 21 25 256 111 112 21 20 20 20 20 20 20 20 20 20 20 20 20 20	323 492 38 118 39 118 119 40 118 119 120 41 118 119 120 121 122 118 119 120 121 122 118 119 120 121 122 118 119 120 121 122 118 119 120 121 122 118 119 120 121 122 118 119 120 121 122 118 119 120 121 122 118 119 120 121 122 118 119 120 121 122 118 119 120 121 122 118 119 120 51 118 119 120 51 118 119 120 51 118 119 120 51
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LOCATION 20628	LOCATION 20638	LOCATION 20649	LOCATION 20658	LOCATION 20667				LOCATION 20696	LOCATION 20706	LOCATION 20715	LOCATION 20723	LOCATION 20730	1 OCATION 20735		LOCATION 20752	LOCATION 20760					LOCATION 20802	LOCATION 20814	LOCATION 20825	LOCATION 20835	LOCATION 20844	LOCATION 20852	LOCATION 20859			LOCATION 20877	
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			26	21	28	128	128	128		20				328			69	132	132	132			201	132	9						
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	664	864 664 424	667 727	664	667	669					664	4		326	99	130	129 130 131	129 130 131	129 130 131	129 130 131	129 130 131	130 130	2	151 051 621	129 130	130	78			8	136
	424	**	454	454	454	454	454	454		**	454	454		327	129	159	129	129		129				159	159	159	159	19		135	508 135
	425	452	425	455	455	426 425	425	424		465	455	455	65	451	203	503	503	503	503	503					203	203	503	503	80	208	508
		424	456	456	456	426	426	424		974	456	456	205	450	205	205	205	505	505	505	502	200	200	205	205	205	205	205	202	201	201
				427 428	42	45	965				427 428	4	4	3	3	45	45	4	3	427 428		6			985	427 428	2	3		43	3
	152 PATH	152 PATH	152 PATH	152	152	152	PATH	PATH	PATE	152 PATH	152 PATH	152	152	153	152	152	152	152	152	152	152	PATH	PATH	152	152	152	152	152	152	152	152

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3.967

FIGURE 4-12 (Cont.)

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4.527

3,688

FIGURE 4-12 (Cont.)

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318	318	318	318	318	318	318	54		56	113	113	113				113	113	113	113	113	37								123	
319	319	319	319	319	319	319	488	52	112	1112	1112	112				115	112	112	112	112	112					. :			122	
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1327			1327						1327	1327	1327	1 327				1 327	1327	1 327	1327	1327	1 327								1 361	
124 0	124 0	125 0	125 0	10 421	124 0	10 421	127 0	125 0	10 421	0 421	0 421	0 421				0 421	0 421	0 421	0 421	0 421	0 421								175 0	
9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 42	9 420	9 420	9 420					027 6	9 420	9 420	9 420	9 420	9 420								025	
1019	1020	416 419	416 41	416 419	416 419	1025	1026	1027	1028	1029	1030		C			1035	416 419	416 419	16 419	1038	1039		7			4	3	1046	1047	1048
153	153	153	153	153	153	153	153	153	153	153	153	PATH	PATH	PATH	PATH	PATH	153	153	153	153	153	HING	P474	PATH	PATH	PATH	PATH	PATH	PATH	153

FIGURE 4-12 (Cont.)

5.242 5.870 5.870 5.870 5.870 5.848 5.8415 5.8415 5.8718 5.907 5.907 5.907 5.907 5.907 5.907 5.907 5.907 5.908 5.907 5.908

FIGURE 4-12 (Cont.)

3.674	3.599	4.527	111.	4.077	**30*	4.304	4.304	5.004	4.777	4.527	4.299	4.015	4.356	4.811	5.038		5.038	5.299	1.499	7.618	7.089	611.9	6.126	999.5	7.180	7.010	6.839	7,335	6.430	6.903	
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		8	136	25		9	130		2	200	2	6 6	7	210	210	210	510	510	5	326	25 726 751	3	326	320		326	326	326	326	326	
		135	508 135	507 508 135	508 135	5	506 135	5	5	5 5		135	200	203	209	209	509	509	500	327	33	;	327	33.	327	327		327	327	327	
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20	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	260	432 433	432 433 567 508	432 433	33	1096	1097	1098	1099	00	1101	25	1103	1104	15.	1106	1107	1108	
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255	254 255	254 255	254 255	254 253	552	254 255	254 255	255	254 255	254 255	254 255	254 255	255	254 255	255	254 255	255	255	254 255	255	254 255	552	254 255	255	764	33	118 119	118 119	118 119
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9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	6 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	9 420	0 450
609	3		17.5	19	9	6 419	9	3	3	15 419	6 419	6 4 19		416 419	6 4 19	1125	416 419	415 419	1128	116 419	16 41	416 419	416 419	416 419	416 419	16 41	9 9	6 419	6 419
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FIGURE 4-12 (Cont.)

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23321	23338	33256	0000	23375	23393	23411	53458	23446	23462	23477	23491	23504	13214	23525	23534	23543	23552	23562	23572	23582	23591	53599	23606	11963	23618	23626	3635	3996	3998	23667	
LOCATION 23321	LOCATION	ASSES WOLLD	5	LOCATION 23375	LOCATION 23393	LOCATION 23411	LOCATION 23429	LOCATION 23446	LOCATION 23462	LOCATION ;	LOCATION ;	LOCATION 23504	LOCATION 23514	LOCATION 23525	LOCATION ;	LOCATION 23543	LOCATION 23552	LOCATION ;	LOCATION ;	LOCATION		LOCATION 23599	LOCATION ?	LOCATION 23611			LOCATION 23635	LOCATION 23645	LOCATION 23656	MOIL	
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;	26	327	327	327	133	33	136	327	327	327	125	361	724	*7.	724	454	724	*2*	454	454	724	664 424	724		621	129 130	57	621	621	621	621
5	7	451	421	421	421	1 6		77	125	12,	7	7	455	Ç	455	455	455	Ç	455	425	452	Ç	52,	6	503	503	505	503	503	503	203
		450	450	420	420	2	03.	024	650	620	024	024	929	97.	1 426	924	929	97,	924	9 456	924	974	929	205	205	205	205	205	205	205	205
139	140	6 419	6 419	142	143	144	145	146	147	148	169	150	151	152	153	154	155	156	157	158	159	150	161	162	163	164	165	166	167	PATH 1168	7 468
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FIGURE 4-12 (Cont.)

4.495 4.324 4.097	3.688	3.729	3.599	,30¢ ,30¢	5.004 4.777 4.527	4.015 4.356 5.038 5.038	1.499 8.263 7.734 7.364 6.771
							470 469 468 467 466 465 454 467 466 465 464 464
LOCATION 23678 LOCATION 23690 LOCATION 23701	LOCATION 2372B LOCATION 2372B	LOCATION 23741		LOCATION 23779 LOCATION 23789 LOCATION 23789	LOCATION 23809 LOCATION 23819 LOCATION 23828	LOCATION 23843 LOCATION 23859 LOCATION 23869 LOCATION 23869	10 LOCATION 23903 30 LOCATION 23913 285 286 287 315 315 481 480 479 473 472 471 27 LOCATION 23913 315 317 481 480 479 473 472 471 470 469 468 LOCATION 2394 481 480 479 473 472 471 470 469 468 467 466 465 20 LOCATION 23994 472 471 470 469 468 467 466 465 464
N = 3				• 2 2 2		, , , , , , , , , , , , , , , , , , , ,	
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FIGURE 4-12 (Cont.)

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7.494	7.324	6.892	7.566	7.794			1.469	7.696	7.866	7.866	8.566	7.866	7.866	7.696	8.169	7.998	7.094	7.556	95.	961.7	7,158	998.9	6.866	7.522	7.522	7.522	7.522	7.522	7.044		204.0	7.204
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17		3 472	2 471	614	1 480	184 8										318	1 481	780	479	187		480	480					318	318	481	319	321
23	22	21 21	473 472	481 480	318 481	319 318	320 319	28	25 350	29	29 22		25 25	28	27	320 319	319 318	318 481	481 480	319 318	319 318	318 481	25	320 319	27	27 27 320		320 319	320 319	319 318	321 320	323 322
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FIGURE 4-12 (Cont.)

FIGURE 4-12 (Cont.)

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7.663 8.363 8.363

FIGURE 4-12 (Cont.)

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b

FIGURE 4-12 (Cont.)

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A/C LATENESS DISTRIBUTION IN MINUTES (RANDOM NUMBER VERSUS TIME)

A/C SEPARATIONS
128 SEPARATIONS
128 SEPARATION VALUES IN 4 SETS OF 32. ARRIVAL, DEPARTURE / ARRIVAL. DEPARTURE / SETS ARE POSSIBLE WAYS OF MEAN AND STANDARD DEVIATION / THE 16 SETS ARE POSSIBLE WAYS OF ACC CLASS / FOLLOWED BY A/C CLASS Y
THERE ARE 4 A/C CLASSES -- 1 - D CLASS / CLASS / CLASS / S - C CLASS / C

FIGURE 4-12 (Cont.)

CHINUTES	(MINUTES)	(MINUTES)
AND A/O	AND A/D	AND A/0
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FIGURE 4-12 (Cont.)

FIGURE 4-12 (Cont.)

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SERV. TIME	2				31.90							n .	•	•		35.17	~			*2.63	24.00	31.50	40.29	47.19	06.99	90 75	2000	KD-15	51.95	46.34	18.75	31,31	17.75	17.23	33.49	40.02	21.84	21 27	23 68	20.00	34. 01	10.00	10.63	37.76	31.37	39.23	38.68	51.60	35.00	17.80	21.60	38.66	32.94	37.54	32.68	42.00	20.00	60.63	10.35	10.00	20.00
DEPART	2:10	21 0	1:40	1:45	1:40				-	: 3	١.		3	••			4		. :		:		-	-	-	::				2	:5	3	4:	-	-	3:25		::	? :	? -	21.72	: :	2	7	=	3	3	=	~	2	~		2130	1		V	2	2	2	55.50	•
ARRIVE	1: 0	1: 0	1: 2		7.	1: 3	1:5	1: 5	3 2 4				1:10	1:10	1:12	1:13	1:15	1:12		61:1	1:19	1:20	1:20	1:20	1120	200	1:50	1163	1:25	1:25	1:25	1:29	1:30	1:30	1:30	1:35	1:35	30.1	200	11.36	000	65.1	07:1	1:42	1:44	1:45	1:45	1:45	1:45	1:45	1:48	07:1	1150	1:53	1:55	55:1	55.1	1	1.55	1:55	
CLASS	~	2	^	. ~	. ~		-	. ~				,	•	2	2	2	-		٠,	7	2	~	2	1		• (٠.	-	_	-	c	2		-		. ~					٠,	•	>	2	2	2	2	7	2	2	3		, ,	. ~	. ~	, -	• •	٠-	• •	٠,	,
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GATE	45	34	,		20,00	4	4	25				09		98	61	62	80	0	0.	61	69	10	64	5	22	200	080	79	69	52	83	32	212	24	75	14	0.0	0	100	2	7;		62	4.1	1	10	88	13	64	21		7 4	0		65		000	000	2.5	17	:
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			•						_				_	_	_		_																																		
2:55	2:3	2:2	310	2.5	3:30	214	2:5	2:3		2.5	3.1.	3:36	3110	3130	4:10	3:15	3:30	3:16	3115	3150			,,,	2.00	3.5	3:30	3:35	3:35	3130	3:15	3:50	3120	2	3:40	3149	*	4:19	, ,	4:4	:0	4:1		4:40	4:40	3155	4:15	4:30	4:15		4:50	4:40
156	28	29	29	0	, ,	4	S	2	2:	7 2	10	20	20	52	52	52	52	92	27	99	35	32	200	34	34	32	36	0 4	0,	45	5	5		25	55	•	s u		12.	12	15	- 0	200	25	23	52	58	30	20	0	0,
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3:40

EXAMPLE 2

		•	.0	0.0		•	0.0							
		TURE	0.0	0.0	0.50 0.0	0.50 0.0	0.50 0.50							
		DEPARTURE C B	0.0	0.0	0.50	0.50	0.50							
		٥	0.0	0.0	0.0	0.0	0.0			<	0.0	0.0	0.0	4
:		TOTAL D	•	•	~	~	•			89 W	0.64 0.36 0.0	0.0	0.36	8
AVERAGE FLOW RATES		4		0						OFF SATE	99.0	0.0	0.64 0.36	TOTAL D C B
RAT		•	0:0	0.0	0.0	0.0	0.0			5	0.0	0.0	0.0	٥
3	TIME - FROM 1. 0. 0 TO 2. 0. 0	TOTAL D C B	0.0	0.0	0.0	0.0	0.0			TOTAL D	=	•	=	OTAL
7		1-100 0	0.0	0.0	0.0	0.0	0.0							
9		-	0.0	0.0	0.0	0.0	0.0			4	0.0	0.0	0.0	4
8 3	- FRG	TOTAL			•	•	•	TOTAL	9	6 0	0.22	0.0	0.18 0.61 0.22	TOTAL D C B A
> 4	TIME							4	0	ON GATE	19.0	0.0	0.61	XI-IX
:		4	0.0	0.0	0.0	0.0	0.0			٥	0.18	0.0	.18	47 0
		VAL	0.32	0.15	0.0	0.0	0.21	•	*	TOTAL	51 0		51 0	TAL
		ARRIVAL C B	0.55	9.0	0.0	0.0	0.61 0.21 0.0	U	36	2	S		S	5
		0	0.14	0.21	0.0	0.0	0.18	٥	01			S.	TOTAL	
		TOTAL	22	36	0	•	99		FLOW				-	
									TOTAL					
		REY NO.	-	~	r	,	TOTAL		GRAND TOTAL FLOW					

MODEL OUTPUT FOR EXAMPLE 1 FIGURE 4-13

0.64 0.36 0.0

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AVERAGE DEPARTURE RUNWAY DELAY	0.0	0.0	1.07	3,38	2,23
AVERAGE ARRIVAL: RUNWAY DELAY	7.0	2.95	0.0	0.0	2.08
RUNWAY	-	~	c	•	MEIGHTED AVERAGE

GE DELAY	DEPARTURE	0.03	2.70
AVERAGE TAXI-OUT DELAY	RUNWAY DEPARTURE CROSSING TAXI-OUT	0.0	DEPARTURE AIRFIELD DELAY = 2.70
AGE Delay	ARRIVAL TAXI-IN	0.0 0.12	DEPARTURE A
AVERAGE TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.0	2.21
AVERAGE GATE DELAY	ARRIVAL DEPARTURE	44.0	ARRIVAL AIRFIELD DELAY . 2.21
AVE	ARRIVAL	0.00	RRIVAL A

...AVERAGE TRAVEL TIME SUMMARY...

0
2
2
0
-:
FROM
TIME

AVERAGE DEPARTURE TRAVEL TIME	0.0	0.0	6.75	8.54	7.64
AVERAGE ARRIVAL TRAVEL TIME	4.28	4.47	0.0	0.0	07.7
RUNBAY	-	~	e .	•	WEIGHTED AVERAGE

FIGURE 4-13 (Cont.)

EXAMPLE 2

... AVERAGE FLOW RATES ...

	∢ .	0.0	0.0	0.0	0:0	0.0								
	TURE	0.0	0.0	0.09	0.35	0.23								
	DEPARTURE C B	0.0	0.0	0.73	95.0	0.63								
	٥	0.0	0.0	0.18	0.12	0.15			4	0.0	0.0	0.0	<	
	TOTAL D	•	•	25	56	8,			8	0.22	0.0	0.22	8	0.22
•				0					OFF GATE	09.0	0.0	0.18 0.60 0.22	TAXI-OUT	50 0.18 0.60 0.22
TIME - FROM 2. 0. 0 TO 3. 0. 0	99-	0.0 0.0	0.0 0.0	0.0 0.0	0.0	0.0			٥	0.18	0.0	0.18	0	0.18
0 10	TOUCH-AND-G0		0.0	0.0	0.0 0.0	0.0 0.0			TOTAL	20	•	20	TOTAL	20
	TOUCH	0:0												
2 HO	•	0.0	0.0	0.0	0.0	0.0	۔		•	0.0	0.0	0.0	•	9
	TOTAL D	•	•	•	•	•	TOTAL	6	آء 8	0.16	0.0	0.16	•	•
TIM	;	0.0	0.0	0.0			4	•	ON GATE	0.70	0.0	0.14 0.70	TAXI-IN	41 0.15 0.71 0.15 0.0
					0.0	5 0.0	60	11	٥	0.14	0.0	0.14	-	0.15
	ARRIVAL C B	0.11	0.17	0.0 0.0	0.0	0.15			TOTAL	:		;	TOTAL	7
	C ARR	0.83	0.61		0.0	0.71	U	89	F				7	
	0	90.0	0.22	0.0	0.0	0.15	٥	13			6A	TOTAL		
	TOTAL	18	23	•	•	7		FLOW				-		
								GRAND TOTAL FLOW						
	REY NO.	-	~	m	•	TOTAL		GRAND						

FIGURE 4-13 (Cont.)

* * * * AVERAGE DELAY SUMMARY * * *

TIME - FROM 2. 0. 0 TO 3. 0. 0

AVERAGE DEPARTURE RUNWAY DELAY	0.0	0.0	2.67	4.56	3,70
AVERAGE ARRIVAL	0.52	5.69	0.0	0.0	1.74
RUNKAY	-	~	•		WEIGHTED AVERAGE

		RTURE	07	4.5
AGE.	ו מבר	DEPA FAXI-	0.10	*
AVERAGE	TAXI-OUT DELAT	CROSSING TAXI-OUT	•••	DEPARTURE AIRFIELD DELAY = 4.5
AGE	DELAY	ARRIVAL TAXI-IN	69.0 0.0	DEPARTURE
AVERAGE	TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.0	2.72
AVERAGE	DELAY	ARRIVAL DEPARTURE	0.76	ARRIVAL AIRFIELD DELAY = 2.72
AVER	GATE	ARRIVAL	0.29	ARRIVAL A

• • • A V E K A G E T R A V E LI T I M E S U M M A R Y • • • TIME - FROM 2. 0. 0 TO 3. 0. 0

5.34	5.55	0.0	0.0	5.46
-	2	·		WEIGHTED AVERAGE
	1 5,34	1 5,34	1 5.34 2 5.55 3 0.0	1 5.34 2 5.55 3 0.0

FIGURE 4-13 (Cont.)

EXAMPLE

7

. . . AVERAGE FLOW RATES . . .

REY NO.	TOTAL	•	ARRIVAL	4		TOTAL	2	TOTAL D C B	09-0		TOTAL	TOTAL D	DEPARTURE	TURE	•
-	=	11 0.16	0.73	0.00		•	0.0	0:0			•		0.0	0.0	
~	•	0.11	0.89	0.0	0.0	•	0.0	0.0		0.0	•		0.0		0.0
•	•	0.0	0.0	0.0	0.0	•	0.0	0.0	0.0	•••	=	0.18	0.73	0.00	
	•		0:	0.0	0.0	•	0.0	0.0	0.0	0.0	82	0.18	0.71	0.11	
TOTAL	8	0.15	9.00 09.0	9.00		•	0.0	0.0		•••	39	0.18	0.72	0.10	
		٥	U	8 0	•	TOTAL									
GRAND TOTAL FLOW	FLOW	2	3	v	•	59									
			TOTAL	4	ON GATE B	. B	•	5	74.	OFF C	TOTAL D OFF GATE B	•			
			2	:	0.15 0.80	90.0	0.0	ň	34. 0	0.18 0.76	90.0 9	0.0			
		3	•	•	0.0 0.0	0.0	0.0		0	0.0 0.0	0.0	0.0			
		TOTAL	20	•	0.15 0.80	0.05	•••	ň	36 0	0.18 0.76	90.0 9	0.0			
			***		TAXI-OUT	•		101	3	TAXI	-001				

FIGURE 4-13 (Cont.)

0.18 0.76 0.06 0.0

20 0.15 0.80 0.05 0.0

. . . AVERAGE DELAY SUHHARY . . . TIME - FROM 3. 0. 0 TO 4. 0. 0

AVERAGE DEPARTURE RUNNAY DELAY	0.0	0.0	2.01	1.78	1.85
AVERAGE ARRIVAL	0.58	9**0	0.0	0.0	0.52
RUNWAY		2	e	•	AVERAGE
					WEIGHTED AVERAGE

	ų,		69
*	PT TO	0.05	8
AVERAGE TAXI-OUT DELAY	RUNWAY DEPARTURE	ė	*
I-OU	¥ 9		DEL
TAX	CROSSING	0.0	DEPARTURE AIRFIELD DELAY . 2.69
	42		ARTURE
AGE	ARRIV TAXI-I	0.0 0.73	050
AVERAGE TAXI-IN DELAY	RUNWAY ARRIVAL CROSSING TAXI-IN	0.0	1.26
			* *
	URE	0.83	DEL
AVERAGE GATE DELAY	ARRIVAL DEPARTURE	•	ARRIVAL AIRFIELD DELAY . 1.26
AVE	RIVAL	0.0	RIVAL A

. . . A VERAGE TRAVEL TIME SUMMARY. . . . TIME - FROM 3. 0. 0 TO 4. 0. 0

AVERAGE DEPARTURE TRAVEL TIME	0.0	0.0	8.78	9.30	9.15
AVERAGE ARRIVAL: TRAVEL TIME	4.61	5.97	.0*0	0.0	5.22
RUNWAY	•	2	. 6		WEIGHTED AVERAGE

FIGURE 4-13 (Cont.)

TAXI-OUT DELAY	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
TAXI-IN DELAY	0.000000000000000000000000000000000000
LINK	0 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

		900000000	00000000000000000000000000000000000000	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0
00600	0000		000000700000	3.1099 12.6875 0.0661 0.2564 1.7470 0.0226 0.00000000000000000000000000000